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What is the Relationship Between Activity, Social Support and Health-Related Quality of Life in People who are Sixty Years of Age and Older?

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What is the Relationship Between Activity, Social Support and Health-Related Quality of Life in People Who are Sixty Years of Age and Older?

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USE OF THESIS

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Abstract

Over one third of individuals aged sixty years and older have health conditions which limit their ability to live an independent and active life. With the older Australian population increasing, the prevention of functional decline and preservation of wellbeing in this age group has become a major clinical focus in gerontology research. Therefore an important goal of health professionals is to identify behavioural factors which encourage wellbeing and quality of life in this age group. The purpose of the present study was to explore the importance of physical activity, passive activity (activities such as craft, reading and board games) and social support on health-related quality of life. Activity, measured by number of hours in activities performed over a month, and social support, measured on the Duke Social Support Index (DSSI) were the predictor variables. The criterion variables were the physical and mental component of the Short Form 36 health-related quality of life scale. Results were analysed using two standard multiple regressions, using as predictor variables physical activity, passive activity and social support. The predictor variables were found to significantly explain only 13% of the variance in the physical component of the SF-36. Physical activity, uniquely predicted 9% of the variance. No other significant associations were found. The explained variance was smaller than expected, and this is likely to have occurred due to limitations of sampling characteristics. However, the findings did suggest that physical activity is an important predictor of the physical health-related quality of life in older people. The results suggested that physical activity played a more important role than passive activity and social support in determining physical health-related quality of life. As might be expected, a positive relationship was found between physical activity and physical health-related quality of life suggesting that an increase in physical activity was associated with an increase in physical health-related

quality of life. The results of the present study supported previous research suggesting that increases in levels of physical activity have potential health benefits for individuals aged sixty years and older. Thus health and community organizations may need to focus on ways in which to enhance the participation levels of physical activity in this age group.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief: incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, does not contain any material previously published or written by another person except where due reference is made in the text, or contain any defamatory material.

Signature:_

Date: 07·08·01

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Introduction

Background

Increasing the health status and quality of life of older people has become an important goal for gerontology research. The continual rise in life expectancy and increasing aged population has lead to a shift in focus from lengthening an individual's life to increasing the quality of life (Spriduso, 1995). Good health in later years is essential for participation in society (Rowland, 1991). Rowland argues that "prevention offers greater benefits than treatment in terms of 'adding life to years' and saving government expenditure on health" (p. 82). Current public health care models for the elderly are based on a preventative and proactive approach to health. Prevention is perceived as an "anticipatory action taken for one or both of two purposes" (CEIDA, 1991, p. 2). The first is to "eliminate the possibility of an event or a condition occurring or developing" (CEIDA, 1991, p. 2). Secondly, prevention is seen as "minimizing the damage that may result from this event or condition if it does occur or develop" (CEIDA, 1991, p.2).

Recent research in gerontology has focused on the robustness of ageing, and the factors which attribute to concepts such as "successful ageing," "productive ageing," or "ageing well" (Garfein & Herzog, 1995, p. 77). Rowe and Kahn (1998) argue that successful ageing encompasses at least three domains; avoidance or low probability of disease; high physical and cognitive functioning; and active engagement in social or interpersonal activity. Unger, Johnson, and Marks (1997) assert that identifying factors which are related to the "reduction of the morbidity that precedes death and extends productivity, independence, and wellbeing of older adults could increase the quality of life of many elderly people" (p. 152). Various factors have been identified as contributing to the health of "successful agers - those individuals who experience little or no functional

decline" and include lifestyle choices such as physical activity and psychosocial factors such as social support and good self rated health (Unger, McAvay, Bruce, Berkman, & Seeman, 1999, p. 245).

Activity has been found to increase health status (Parkatti, Deeg, Bosscher, & Launer, 1998; Wallace, Buchner, Grothaus, & Leveille, 1998) and has been positively associated with perceived quality of life (Lindgren, Svardsudd, & Tibblin, 1994). Physical health gains to physical activity have been well documented and include reduction in cardiovascular risk (Paffenbarger, Hyde, & Wing, 1993), control of obesity (Sidney, Shepard, & Harrison, 1977), and better lipid profile (Matter, Stanford, & Weltman, 1980). These physiological benefits to physical activity in the elderly are associated with a decrease in physical decline, maximizing functional capacity (Shephard, 1990) and preserving autonomy (Heikkinen, 1997).

Although not as clear regarding the relationship to physical benefits, physical activity has also been linked to good mental health and positive psychological benefits. Physical activity has been associated with decreased depression, anxiety and stress, cognitive function, self confidence and life satisfaction among adults (Dustman, Emmerson, & Shearer, 1994; O'Connor, Aenchbacher, & Dishman, 1993).

Limited research has also investigated types of activity and health outcomes. Daily and leisure activities have been associated with positive health benefits (Glass, Seeman, Herzog, Kahn, & Berkman, 1995). Solitary activities such as reading have also been noted as a positive determinant of life satisfaction in older adults (Palmore & Kivett, 1977). Furthermore leisure activities such as volunteer work and attending cultural events have been shown to be positively related to life satisfaction (Riddick & Daniel, 1984). Although

some studies have found that satisfaction with leisure is more influential to life satisfaction than participation in leisure (Ragheb & Griffith, 1982).

Evidence concerning the relationship between social support and health in older people varies with the particular definition and operationalisation of social support (Revicki & Mitchell, 1990). Research into social support has included objective and subjective measures and related dimensions such as quality versus quantity, function versus structure, and relationships versus social network. Social networks and social interactions have been found to have a direct effect on the risk of mortality, incidence of cardiovascular disease, cancer survival and physical functioning (Unger et al., 1997). In addition, social support has also been found to function as a "stress buffer, minimizing the negative effects of life events, stresses, and job strains on mortality, health complaints, health-related absences from work and depression" (Unger et al., 1997, p. 152). Some studies have suggested an association between social support and perception of health (Lindgren et al., 1994). Sherbourne, Meredith, Rogers, and Ware (1992) investigated the impact of social support and stressful life events on the chronically ill. They found social support was beneficial to health-related quality of life, with low levels of social support being particularly damaging for the physical functioning of older people.

Demographics

Preventing ill health and maintaining the functional wellbeing of elderly citizens is socially and economically important for a society (Family and Community Development Committee, 1997). Traditionally Australia has been a youthful society and has had high expectations of government support in areas of publicly funded health care and social services (McCallum, 1999). However, concern has been raised that the ageing population will be an increasing and unacceptable burden on health care expenditure (Chappell, 1997).

Population estimates suggest people 65 years and older could make up to 27% of the Australian population by the year 2051 (Australian Bureau of Statistics, 1999). Presently within Western Australia, those 60 years or older make up 14% of the population. Future 2021 projections suggest that nearly 1 in 4 West Australians will be 60 years of age or older. In 2051 the number of West Australians 60 years or over will be almost double that of today, whilst those 80 years of age or over will be treble that of today (Australian Bureau of Statistics, 1999). The largest increase of the population aged 65 years and older will occur between 2006 and 2011 when the first wave of the "Babyboom" cohort reaches aged 65 years.

Furthermore, a worldwide trend in health care reform is an emphasis on the reduction of health care costs (Chappell, 1997). Past expenditure by Commonwealth and state governments has been on average twice as much for every older person as for every younger person and recent current estimates suggest that approximately two thirds of health expenditure is directed at one tenth of the population 65 years and older (McCallum, 1999). However, although the number of older people who will need health care is expected to grow, the increase in those who need health care will be dependent on whether or not the aged are healthy (Kendig & McCallum, 1986).

The prevention of ill health and factors related to the functional wellbeing of elderly individuals is the focus of the present study. The following section will firstly explore frameworks of health and ageing in the elderly. The measurement of health-related quality of life will then be outlined as will the benefits of activity and social support to well being in the elderly.

Frameworks of Health and Ageing

It has been argued that the conceptualisation and measurement of health has limited the understanding of wellbeing in the elderly (Verbrugge, 1990). Conceptually The World Health Organisation (WHO) views health as multifaceted in nature and has defined health as a state of "complete physical, mental and social wellbeing not merely the absence of disease and infirmity" (Bowling, 1991, p. 7). Thus the WHO definition encapsulates health as more than the nonexistence of disease and also acknowledges health as multidimensional, encompassing physical, mental and social components.

Early health measures relied heavily on the presence or absence of negative health states, functional limitations, symptoms of disease and acute and chronic problems (Ware, 1992). More recently, the WHO definition of health has been used as a gross framework for health measures and a more positive perspective of health has been adopted (Bowling, 1991). Positive health status can be described in various ways and includes concepts of: ability to cope in stressful situations, social support systems and interpersonal relationships, high morals, life satisfaction, psychological well being and levels of physical fitness and physical health (Lamb, Brodie, & Roberts, 1988).

Quality of life is often a term used in conjunction with health status, however not all health status measures encapsulate the dimension of quality of life, as it is a broader concept than health status and includes a social dimension of wellbeing (Bowling, 1991). More recently however, general health status has been referred to as health-related quality of life (Ware, 1995). Contemporary health measures are generic in form, focusing on health concepts that "represent basic human value and are relevant to everyone's health status and wellbeing" (Ware, 1992, p. 6). Current health measures focus on the holistic nature of

health, and acknowledge its aspects of "completeness" and connotations of "all is functioning well" (Ware, 1995, p. 329).

Measurement of Health-Related Quality of Life

Self ratings of health have been shown to be a significant and independent predictor of survival independent of objective health status indicators (Mossey & Sharpiro, 1982). In a sample of 7,527 participants Lee (2000) examined the ability of self assessed physical and mental health to predict functional decline and mortality. Using eight measures, of self reported general, physical and mental health the results of the multivariate analyses suggested that overall, self assessed general, physical and mental health were predictive of functional decline and mortality.

McCallum (1995) suggests that the increasing use of health status as a health measurement has evolved through developments such as: "acknowledgement of the multidimensional nature of health, measuring health care outcomes rather then constraining health care costs and recognising the importance of the patient's point of view in monitoring health outcomes" (p. 160). Past research has often measured perceived health status by one question "how do you rate your health at the present time?" (Riddick & Daniel, 1994). However, growing evidence regarding the inadequacies of a one-item measure has lead to a development of multidimensional health measures. The measurement of health has moved towards a self-reporting generic tool which is multidimensional in nature and not specific to age, disease or treatment (Ware & Sherbourne, 1992).

Using the short form Medical Outcome Study's physical and emotional health-related quality of life scale to measure wellbeing, Sherbourne et al. (1992) investigated the impact of social support on the long term physical functioning and emotional wellbeing of 1402 chronically ill patients. The results of the Sherbourne et al. study suggested that in

general social support was beneficial for health regardless of age. However, emotional wellbeing showed an interesting trend with the high social support group displaying significant decline over time. Based on the findings the authors concluded that measuring the dimensions of health-related quality of life separately allowed for a greater understanding of the complexities associated with a lack of social support and health outcomes (Sherbourne et al.).

The SF-36 has been developed through accumulation of many years of investigation into short and long health surveys associated with the Medical Outcome Study (Ware & Sherbourne, 1992). The SF-36 is a subjective self reporting scale which has been psychometrically tested and validated in the United States (McHorney, Ware, & Raczek, 1993), United Kingdom (Lyons, Perry, & Littlepage, 1994) and Australia (McCallum, 1994). The SF-36 was designed to be used in clinical practice, research, evaluations of health policies, and general population surveys (Ware & Sherbourne, 1992). Further discussion on the validity and reliability of the SF-36 is reported elsewhere.

The SF-36 was developed to broaden the health concepts measured and improve measurement precision for each concept over that already achieved by the SF-20 (McHorney et al., 1993). The SF-36 is a generic rather than specific measure of health status. Although brief to administer the SF-36 is comprehensive, representing multidimensional health concepts and measuring a full range of health states including wellbeing and personal evaluations of health (McHorney et al.). The SF-36 has two subscales of health status physical and mental, ascertained from eight concepts: physical function, impact of physical health on role performance, impact of mental health on role performance, bodily pain, social functioning, general mental health, vitality and general health perceptions. The eight concepts measured by the SF-36 constitute the core set of

generic health outcomes assessed in the Medical Outcomes Study longitudinal research (McHorney et al.).

As there has been disagreement regarding the effectiveness of self-administrating the SF-36 in an elderly sample, McCallum (1995) has suggested caution with this method of completion. More recently Parker, Peet, Jagger, Farhan, and Castleden, (1998) found that self completion was not an appropriate form of data collection with older hospital inpatients. Hayes, Morris, Wolfe, and Myfanwy (1995) also found a 70% rate of one or missing data points with participants aged over 75 years. Nevertheless, given the extensive testing of the SF-36 and in the absence of a demonstrably better scale with an elderly population it has been argued that the SF-36 presently remains one of the best measures of health outcomes (Gladman, 1998).

Activity

Much of the research on wellbeing has focused on the importance of remaining an active and vital member of the community (Everard, 1999). A prominent sociological theory used to explain successful ageing is Activity theory (Cumming & Henry, 1961). The premise of the theory is that optimal ageing is characterized by activity (Riddick & Daniel, 1984). The more active the elderly are and the more roles they play, the greater their life satisfaction and the longer their life. A less supported view of ageing is Disengagement theory, which argues that a reduction in social involvement and responsibilities is both desired and functional in older age. Both society and the individual mutually withdrawn from each other (Cumming & Henry).

While there is a general consensus regarding the activity theory premise that activity is beneficial to health, conflicting results are often found regarding the dimensions of health outcomes (McAuley & Rudolph, 1995; Wallace et al., 1998) and the types of activity that

provide these benefits (Gitlin et al., 1992; Kelly, Steinkamp, & Kelly, 1987). Given the increased popularity in which activity is prescribed to the elderly, it is imperative that further research more closely evaluates the dimensions of these relationships (Gitlin et al.).

Participation in physical activity has been linked to an increase in physical health status. Gitlin et al. (1992) investigated the results of an exercise training program and found increased oxygen consumption and a reduction in incidence of new cardiac conditions in an exercise group compared to a control group. However, although showing improvement after exercise all other predictors including perceived quality of life and mental health did not reach statistical significance. Gitlin et al. suggested that the participant's already high levels of functioning within the predictor variables may have limited the effect of the exercise program.

Other research has found a positive relationship with exercise and both physical and mental health status. Wallace et al. (1998) conducted an experiment exploring the potential benefits of an exercise program on the physical and mental components of the SF-36 health-related quality of life measure. Data was collected at baseline, two months, and six months, intervals. No significant difference in the baseline was found, however after six months those in the exercise intervention group displayed an increase in scores on both components of the SF-36, whereas scores on the SF-36 in the control group all showed a decline. A significant difference was found between the two groups suggesting physical activity was associated with an increase in both physical and mental health status.

McAuley and Rudolph (1995) conducted a meta-analytic review of 38 studies exploring physical activity, exercise and psychological wellbeing. Physical activity was defined as "bodily movement involving the skeletal muscles that result in energy expenditure" (p. 70). Whereas exercise was defined as "planned repetitive and structured

activity with the goal of improving cardiopulmonary fitness" (p. 70). The review concluded that in spite of the differences in methodologies, designs, and measurement techniques, psychological wellbeing indeed appeared to be associated with physical activity. However, some studies have found that intensity of activity may mediate health outcomes. For example, a study exploring the effects of levels of exercise on mental wellbeing was conducted by Moses, Steptoe, Mathews, and Edwards (1989). One hundred and nine sedentary adults were assigned to one of four conditions; high exercise (15-60 minutes of duration, 3 to 5 times per week); moderate exercise (20 minutes continuous walking, 4 times per week); attention placebo group (performing strength, mobility and flexibility exercises once per week and slow discontinuous exercise of low intensity for 30 minutes three times per week); and a waitlist control group. Psychological measures included the Profile of Mood States and a series of subscales developed to measure perceived coping ability and physical wellbeing. The items of the subscales assessed coping ability, feeling of mastery and subjective changes that accompany exercise (Moses et al.).

The results of Moses et al's. (1989) study revealed a significant interaction over time, on the physical wellbeing scale. Over time all three active treatment groups showed improvement on perceived physical wellbeing while the waitlist group showed a decrease. However, benefits in psychological wellbeing was only observed in the moderate exercise group with no other condition showing a significant increase. In interpreting the results Moses et al. suggested that the other factors such as feelings of self-control and mastery may have influenced the psychological benefits of activity. The moderate activity levels may have been more enjoyable allowing for participants to achieve goals without exerting undue effort. Conducting a similar study to Moses et al. (1989) Blumenthal et al. (1989) found that only high levels of physical activity yielded improvement in psychological

wellbeing. Blumenthal et al. concluded by suggesting that already normal healthy adults may benefit less psychologically from lower intensity physical activities than individuals with poor mental health. Both studies therefore suggest that the relationship between physical activity and psychological wellbeing is complex and other factors such as intensity of activity and level of mental health may also influence health outcomes.

Leisure satisfaction has been found to contribute more to the variance of life satisfaction than leisure participation (Ragheb & Griffith, 1982). Romsa, Bondy, and Blenman (1985) found that the number and type of activity was more significant than the frequency of involvement in an activity. This finding supports the notion that the importance of an activity is not solely determined on the frequency of engagement, but its value is also influenced by the meaning it holds to the individual (Everard, 1999; Ragheb & Griffith; Susman, 1976). However, types of activities and relationship to health outcomes have received little attention (Kelly et al., 1987). Furthermore the limited studies which have investigated the potential health benefits of various activities have not been consistent in their findings (Russell, 1987).

Kelly et al. (1987) explored the relationship between later – life satisfaction and types of activity. They defined activity as "engagement in regular or patterned action with others other than routine maintenance" (Kelly et al., 1987, p. 189). The age range of their sample was 40 to 75+. Using factor analysis 27 kinds of activities were reduced to eight subsets; community organizations, cultural, travel, home-based, sport and exercise, family, outdoor, and social activities. By statistically controlling for health, marital status, age, education level, sex, and occupational level through multiple regression they found that leisure activity was the most important non-economic factor in subjective wellbeing, accounting for 13:3% of the total 21% of variance explained. For the entire sample all types

of activity, except community organizations (church participation and clubs or organizations), were associated with higher subjective satisfaction. The results also indicated that the kinds of activities associated with wellbeing were different for age groups. For the ages between 65-74 years social and travel activities were significantly associated with life satisfaction whilst home based and family activities were significant for those aged 75 years and older. Although the study employed a cross-sectional design with possible confounding cohort effects, it was concluded that the findings warranted further investigation of the association between kinds of activities and their potential benefits to health (Kelly et al.).

As McAuley and Rudolph (1995) concluded after a meta-analytic review of activity and wellbeing: "It is unlikely that any one psychological social-environmental or physiological mechanism will adequately explain this complex relationship. Rather multidisciplinary approaches to the study of the physical activity/psychological health relationship that embrace the interaction of such mechanisms are warranted" (p. 91).

Social Support

Recent research exploring health status has linked social support to the promotion of health and wellbeing among the elderly (Bowling, 1991). Social support has been found to have numerous direct health benefits to the individual such as an increase in physical functioning (Unger et al., 1997), a decrease in the risk of mortality and cardiovascular disease, increased cancer survival (Blazer, 1982) and an influence on neuroendocrine immune functioning (Unger et al.). Additive to the direct effects on health, social support has also been found to act as a buffer against stress, reducing the negative impact of life events such as widowhood (Unger et al.), financial problems (Sherbourne et al., 1992) and health complaints such as depression (Sherbourne et al.).

The direct model of social support suggests that high levels of social support is beneficial to mental health regardless of the levels of stress experienced (Landerman, George, Campell, & Blazer, 1989). The stress buffer model of social support however suggests that social support is only beneficial to health under stressful conditions (Landerman et al.). Exploring both models of social support, Unger et al. (1997) conducted a study investigating the effects of social interactions and physical activity on the typical declining functional ability of older adults. Data from a longitudinal study on ageing and a sample of over 7,000 participants, aged 70 years and over was utilized. Results indicated that although the effect of physical activity was stronger than that for social interactions, both exerted independent effects on functional decline. Furthermore, the effects of widowhood were found to be buffered by physical activity and social interactions. The researchers concluded that both the main and the stress buffer model of social support was supported and furthermore that health promotion programs were needed to encourage both physical and social interactions in the elderly. However, Unger et al. also acknowledged that the independent effects of different types of activity and different types of social support was not examined and suggested that future research should include types of activity and measures which allowed exploration of different dimensions of social support.

Smith, Fernengel, Holcroft, & Marien (1994) conducted a meta-analytic review of 67 studies exploring different types of social support and its association with physical, psychological and stress related health outcomes. Although not reporting the exact percentages of explained variance they did suggest that social support only explained a relatively small amount of variance in health outcome (Bosworth & Warner Schaie, 1997). Different measures of social support, the operationalisations of health status used, and cohort effects such as general levels of health were all suggested as explaining the variation

in associations (Bosworth & Warner Schaie). Others have argued that the importance of social support to the health of older people is well documented, however, an understanding of the dynamics of this association is still evolving (Goodger, Byles, & Higginbotham, 1998).

Research into social support has been hampered by an array of definitions, methodologies, and theories. The operationalisation of social support varies according to the perspectives of individuals being studied and researchers who study them (Kendig & Brooke, 1997). Currently research has focused on the interpersonal environment, social interaction, the perceived quality of the interpersonal environment and the function of the interpersonal environment (Powell Lawton & Moss, 1987). Some studies have explored the structural aspects of social support such as the size and density of social networks (Seeman, Bruce & McVay, 1996). Other research suggests that although social support structure is important to the health status of the elderly, the content and quality of these relationships is more important (Litman, 1997).

Kaplan et al. (1994) suggested two dimensions of social support: the size and structure of the social network and the nature of the network links. Social network has been described as the "set of people whom one maintains contact and has some form of special bond" (Bowling, 1991, p. 69). Social network research can be objective, quantifying elements such as number of contacts and social interactions, frequency of contacts, or can be subjective, qualifying adequacy of network, perceived support and satisfaction with social network (Bowling, 1991). The results of research exploring networks is equivocal, with some studies finding network size to be predictive of mortality suggesting those with fewer social ties being most at risk (Kaplan et al.). However, other studies have found little difference in the decline in mortality between those most socially isolated and those with

large network ties (Blazer, 1982). Still other studies exploring social networks argue that poor quality of social support is a stronger predictor of mortality than network size (Kaplan et al.).

Harel and Deimling (1984) explored the relative importance of four factors of social support on a self-rated mental health measure. Initial factor analysis identified four factors comprising of three objective factors; social attachments, resource availability, and social interaction and one subjective factor; perceived adequacy of social resources. Using multiple regression, the findings suggested that 13% of the variance on self-rated mental health could be explained by perceived adequacy of social resources, the availability of social resources and social attachments. Harel and Deimling concluded that the objective measures of social attachments and social interactions accounted for a relatively minor amount of variance in self rating mental health. However, the results indicated and supported the importance of both subjective and objective dimensions of social support in determining mental health among elderly people.

The investigation of the association between social support and older people has also been hampered by a lack of brief, psychometrically sound measurements that can be self administered (Koenig et al., 1997). Longer social support scales may offer greater sensitivity than shorter scales (Goodger et al., 1998). However, longer measures may be burdensome to older individuals and justification of their use may be difficult when interview schedules include many scales or social support is not the principle area of interest (Goodger et al.).

The availability of brief social support scales which have been validated specifically with an older population has been limited (Goodger et al., 1998). However, one scale which has been recently validated with an Australian elderly population is the 11 item Duke

Social Support Index (Goodger et al.). Adapted from the 35 item DSSI, the 11 item DSSI incorporates two dimensions of social support: social interaction which is a objective measure quantifying type and number of social interactions and social support satisfaction, an subjective evaluation of support received (Goodger et al.).

The study described in this thesis targeted the elderly, as the most rapidly growing sector in Australian population (Hickey & Stilwell, 1991). It has been argued that the goal of health professionals today is to achieve a more effective life for the elderly by preserving functionality and wellbeing (Ware, 1995). Current public health care models adopt a holistic approach incorporating all aspects of health, with prevention or reduction of decline being the ultimate aim. The study encompasses the holistic nature of health exploring both physical and mental components as measured by the generic health-related quality of life instrument the SF-36 (Ware & Sherbourne, 1995). Two factors identified as being associated with wellbeing and health-related quality of life in the elderly are activity and social support (Moses et al., 1989; Sherbourne et al.,1992). Therefore the purpose of the present study was to explore the association between activity, social support and health-related quality of life in people who are sixty years of age or older.

The study incorporated the dimension of passive activity as a research variable as limited research has been conducted on various types of activities other than physical. Moreover, the Duke Social Support Index was chosen as the social support measure for the present study as it includes the social support dimension social network, previously found to be associated with beneficial health outcomes. The Duke Social Support Index also includes both an objective and subjective measure of support and has been validated with an Australian elderly population.

Standard multiple regression will be conducted as this analysis allows for the assessment of the relative importance in variables in determining health-related quality of life. Two research questions were explored firstly;

1) How do physical activity, passive activity and social support interact with health-related quality of life? And secondly;
2) Which is the most important physical activity, passive activity or social support in predicting the mental and physical components of health-related quality of life?

Method

Participants

One hundred and fifty-eight surveys were distributed to individuals who were 60 years of age and older and living in the Busselton region of Western Australia. Of these 96 participants returned the surveys representing a response rate of 61 %. Response rates as a function of community organizations are shown in Table 1. All participants were identified through four local organizations. Three organizations, Busselton Senior Citizens Center, Busselton Spinners and Weavers and Busselton & District Genealogy Society offer some form of physical or passive activity. The fourth organisation, the South West Division of General Practice, is a managing body for South West General Practitioners and was chosen for its ability to provide participants who may have been less active. Detailed discussion on selection criteria of organizations and participants can be found in the participant's selection section.

Table 1

Response Rate of Community Organizations

Organisation	Distributed	Returned	Rate
South West Division General Practice	60	35	58%
Senior Citizens Center	78	46	58%
Spinners/Weavers	10	9	90%
Genealogy Society	10	6	60%

The participant's ages ranged from 60 to 96 years of age with a mean age of 71.8 (*SD*=7.1). The sample contained 25 males (26%) and 71 females (74%). A total of 75 participants ranging in age from 60 to 84 years and with a mean age of 70.36 years (*SD*= 5.8) were included in the initial analysis with 22 males (29.3%) and 53 females (70.7%). Further details on the selection criteria for participants are discussed in the procedure section.

Materials

A Demographic Sheet (Appendix A), Activities Profile (Appendix B), the Duke Social Support Index (Appendix C), and the Short Form 36 Health-related Quality of Life Scale (Appendix D) were all utilised for the purpose of this study.

Demographic sheet

The purpose of the demographic sheet was to provide information on gender, age, marital status, socioeconomic status, co-morbidity of disease and disabilities (Appendix A).

In all cases, except those identified by the General Practitioners, the Demographic sheet also included questions from the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). The Short Portable Mental Status Questionnaire (SPMSQ) was utilised to assess ability to give informed consent for those participants who were not screened by their General Practitioner. The SPMSQ is a concise measure of orientation and memory and was selected due to its ease of administration and suitability for hearing impaired participants (Pfeiffer, 1975). Those items from the SPMSQ that were either congruent with the demographic profile such as to-days date, age, month, and year of birth or were able to be answered through self administration were included in the demographic sheet. This reduced the amount of items, which needed to be answered by participants. No participants were excluded from the study due to the SPMSQ screening process.

Activities profile

The Activities Profile (Appendix B) was generated solely for the purpose of the present study, therefore no psychometric properties can be cited. The measurement taken from the activities profile was total hours spent undertaking activity in the last four weeks. It has been suggested that the optimal form of measurement for activity should include both a quantifying indicator such as time spent per month doing each activity and a measure of the value or significance of those activities (Glass et al., 1995). However, as there is presently no consensus in the literature regarding the best strategy for valuing different types of activities only hours spent per month was collected in the current study (Herzog & Morgan, 1992).

Hours spent in the last four weeks was collected on the following activities: bowls, cycling, golf, riding, walking, tai chi, yoga, swimming, badminton, tennis, fishing, boating, water aerobics, gardening, traveling, general home duties, paid work, volunteer work,

cultural outings, church, playwriting, attending TAFE or university, book reading, poetry reading, entertaining, watching television, bingo, board-games, card games, art, craft, carpentry and mechanics.

Data gathered from The Activities Profile was utilised to create two variables- total time spent in the last four weeks in physical activities and passive activities. To ascertain the most sensitive measurement of physical and passive activity an analysis was conducted to explore the correlations between a combination of different activities and health status. For physical activity it was decided to delete gardening, travelling, general home duties, paid work and volunteer work from further analysis as inclusion of these types of activity reduced the degree of relationship with physical health status. The deletion of these types of activity was also justified on the basis of face validity. All other items included in the physical activity scale were 'pure' sport related items of physical activity. A criticism of past activity scales is that many activities are not well defined and named (Jacobs, Aisworth, Hartman, & Leon, 1992) and reduced accuracy of memory recall has been associated with general home duties and yard work (Slater, Green, Vernon, & Keith, 1987). Cultural outings and attending church were excluded from the passive activity scale as the inclusion of these types of activity also reduced the association with health status. Future research exploring types of activity could use factor analysis as a method of determining the types of activities for inclusion.

After exploratory analysis of the activity categories the final composition of total time spent in physical activity was calculated by adding hours spent in bowls, cycling, golf, riding, walking, tai chi, yoga, swimming, badminton, tennis, fishing, boating and water aerobics. The total time spent in passive activity was calculated by adding together total

time spent in playwriting, attending TAFE or university, book reading, poetry reading, entertaining, bingo, board games, card games, art, craft, carpentry, and mechanics.

Social support

The 11 item Duke Social Support Index (Appendix C) examines two dimensions of social support identified as being important in promoting health and buffering stress (Koenig et al., 1993). The two dimensions measured by the Duke Social Support Index DSSI are social interaction and social support satisfaction. The social interaction dimensions include items 1-4 and is an objective evaluation of type and number of social interactions. A question such as "How many times during the past week did you spend some time with someone who does not live with you?" is characteristic of the social interaction component of the DSSI. The satisfaction dimension includes questions 5-11 and is a subjective evaluation of support received. A question such as "Does it seem that your family and friends (i.e., people who are important to you) understand you?" is characteristic of the satisfaction dimensions of the DSSI.

The DSSI has been validated specifically for use with older people, it is brief, easy to administer and has been well received and accepted by older people (Goodger et al., 1998). Goodger et al. tested reliability and validity of the DSSI in a representative sample of older people living in urban Australia. Internal consistency using Cronbach's alpha for the overall index was .77, test-retest ranged from .70 to .81, concurrent validity was supported by the DSSI with moderate to strong correlations with the Interview Schedule for Social Interaction (ISSI). Construct validity was supported by moderate correlations with single item measures of health, quality of life and loneliness.

Raw scores for the social interaction dimension were initially taken from the DSSI then scaled into a value of 0=1, 1-2=1, >2=3. Responses for the satisfaction dimension

were scored as hardly ever = 1, some = 2, and most =3. The score range for the social interaction subscale is 4-12. The score range for the satisfaction subscale is 7-21. Totals for each subscale were then summed and then added together to form the total SDSSI score, which ranged from 11-33.

Health-related quality of life scale

The self reported SF- 36 (Ware & Sherbourne, 1992) was chosen for its comprehensiveness, ease in administration and validation with an older Australian population (Appendix D). The SF-36 was used in a half sample of the 1995 Australian National Health Survey (ABS, 1995). From this Australian population norms have been developed and validation with an Australian population has been undertaken (McCallum, 1995).

The SF-36 encompasses two subscales of health: physical and mental, with eight concepts. Initial construct validity testing of the SF-36 through principle component analysis confirmed the hypothesized physical and mental dimensions of health (McHorney et al., 1993). McHorney et al. further confirmed the SF-36's validity and reliability in the concepts identified to primary measure physical health (physical functioning and role limitations –physical) and mental health (mental health and role limitations –emotional). Physical functioning and role limitations-physical were shown to best distinguish groups differing in severity of chronic medical conditions and mental health and role limitations-emotional best distinguished groups differing in the presence and severity of psychiatric disorders (McHorney et al.). This finding was also evident across various combinations of the medical and psychiatric conditions.

Jenkinson, Wright, and Coulter (1994) conducted a study determining the criterion validity of the SF-36 in a large community sample. The sample consisted of 9, 332

individuals aged from 18-64 years. The first item of the SF-36 was used as the criterion variable and measurement was taken with its association with the seven other SF-36 health concepts. Jenkinson et al. acknowledged the rarity in using an item from the same questionnaire to evaluate the criterion validity of that questionnaire. However, it was argued that the first item of the SF-36 had been used in previous studies investigating the validity of other instruments and also that the first item was unidimensional and did not contribute to the scales of the other seven dimensions (Jenkinson et al.). Kruskal-Wallis tests were conducted between the first item on the SF-36 and the other seven dimensions of the SF-36 tests indicating clear linear trends between decreasing SF-36 scores and health-related problems. Using Cronbach's alpha statistic internal consistency was high with all dimensions gaining larger than .75.

Similar validation results have been found with samples of older people. Using a sample of 216 adults aged 65 years and older Lyons et al. (1994) found a high degree of internal consistency with Cronbach's statistic over 0.8 for each parameter. Furthermore the SF-36 has been validated on an Australian sample. McCallum (1995) explored the content and construct validity of the SF-36 and found inter-item correlations ranged from 0.4. The SF-36 scales were also found to have high internal consistency with Cronbach alphas of 0.8 or higher. McCallum found support for the validity of the SF-36 with an Australian sample and lent support to previous findings in the United States and the United Kingdom.

The SF-36 is standardized in its questions, responses and scoring which is an efficient way in which to monitor health status (Ware & Sherbourne, 1995). Responses for the SF-36 items and scales are constructed for scoring using the Likert method of summated ratings. In the current study total raw scores for each of the eight concepts were summed then a computation of *z* scores using Australian norms was obtained. Finally the

two component scores of physical and mental health were obtained by weighting each total concept *z* score with coefficients from Australian population norms (ABS, 1995) and then summing them together.

Procedure

Selection of participants

Two main sources for data collection were initially identified in consultation with the local Home and Community Care Coordinator. Local community organisations were suggested as a source of participants as it was assumed they would attract members from the community who were generally active and well supported. Patients from General Practitioners were also identified as another possible source of participants. It was assumed that General Practitioners would provide a greater number of less active (due to health issues) and socially supported (due to social isolation and immobility) participants than those from the community organisations.

The South West Division of General Practice was identified as a point of first contact with practitioners. Contact was initially through the coordinator who was briefed on the study and then accepted to take on a liaison role between the researcher and general practitioners.

This study was to be part of a larger research project conducted in the Busselton region. Two separate studies were to use the same methodology with one sample taken from a residential care population and the other (the present study) sample from the community. Thus the present study was only representative of a community sample. The limitations of this non representative sample is addressed in the discussion section.

Protocol

Through initial contact with local community organisations (Appendix E), the coordinator of Busselton Senior Citizens expressed interest in the research and was contacted for further arrangements. With the aid of the coordinator, prospective participants were given a brief overview of the research whilst they attend the centre for weekly activities. Those who expressed an interest in the research were given a package and asked to return it to the centre on completion. The packages included an Information Sheet to the Participant (Appendix F (i)), Participant Consent Form (Appendix G), Demographic Sheet including questions from the Short Portable Mental Status Questionnaire (Appendix A (i), Activities Profile (Appendix B), the Duke Social Support Index (Appendix C), the SF-36 Health Status Scale (Appendix D), and a stamped addressed envelope.

Two other agencies expressed interest in the study and were included in the sample. Busselton Spinners and Weavers and Busselton Genealogy Society. Both presidents of these organisations were sent ten packages (based on anticipated numbers) each and asked to hand out packages to interested participants. Both packages included the same questionnaire as the Senior Citizens; an Information Sheet to the Participant, Participant Consent Form, Demographic Sheet including questions from the Short Portable Mental Status Questionnaire, Activities Profile, The Duke Social Support Index, The SF-36 Health Status Scale. The Genealogy Society was asked to post the packages back and had in their packages a stamped addressed envelope. However, participants of the Spinners and Weavers expressed a preference for the completed packages to be collected so this method of return was undertaken.

The coordinator of the South West Division of General Practice contacted General Practitioners and presented them with a brief letter explaining the research (Appendix H).

Those who expressed support agreed to identify 50 individuals from their client records who were not cognitively impaired and who were able to provide informed consent. These names were then given to the coordinator who in turn posted survey packages out to the prospective participants. Packages included, a cover letter from the General Practitioners (Appendix I) stating their support for the research and how the participants have been identified, an Information Sheet to the Participant (Appendix F (ii)), Participant Consent Form (Appendix G), Demographic Sheet (Appendix A (ii), Activities Profile (Appendix B), The Duke Social Support Index (Appendix C), The SF-36 Health Status Scale (Appendix D), and a stamped addressed envelope.

Three organizations displayed similar response rates however the response rate of Busselton Spinners and Weavers participants was much higher at 90%. This high response rate from Busselton Spinners and Weavers may have been due to a difference in collection method from the three other organizations. For ease of return the participants of Busselton Spinners and Weavers handed the completed surveys to the organisation's President. The researcher then collected all completed surveys from the President. Having the survey collected rather than having to mail or return via a collection box may account for the differences in response rate.

Ethical considerations

The study was approved by the Ethics Committee from the School of Psychology, Edith Cowan University. To ensure confidentiality of participants, no names or individuals addresses were asked for. At all times confidentiality was assured and the right to withdraw from the research at anytime was explained. Utilising coordinators or presidents of organisations, ensured anonymity of members and the client/doctor confidentiality was observed at all times. Furthermore, to ensure informed consent all packages included

information regarding the research. To guard against the absence of informed consent participants were screened for cognitive status by using the answers to the written mental status questionnaire and assessment of ability to answer the questionnaires. The coordinator of Busseltons Senior Citizens Centre also used her working knowledge and judgment of member's cognitive status when distributing the packages. Participants obtained through General Practitioners were screened for cognitive status through the professional knowledge and judgment of the General Practitioner and the participant's ability to answer the questions in the survey.

Design and Analysis

Two standard multiple regressions were conducted, firstly to explore the associations between physical activity, passive activity, social support and physical and mental health status and secondly, to determine which variables were most important at predicting health-related quality of life. Multiple regressions were conducted on both transformed and untransformed data. This procedure was undertaken to enable detection of any changes in relationships between variables after transformation. If analysis of both transformed and untransformed data were consistent, then it was likely that a robust effect had been found. If, however, one analysis did not support the other then the results were interpreted with caution. [1]

Exploration of Data

The criterion variables, the physical and mental components of the SF-36, and the predictor variables physical hours, passive hours and the Duke Social Support Index were examined prior to analysis through SPSS FREQUENCIES for accuracy of data entry, missing values and violations of the normality assumption.

Missing data was found in 65 cases. Of those 21 participants were deleted from the sample due to over 20% or more of missing data points (Downey & King, 1998). Of the 75 participants left, 44 were found to have either one or several missing data. For the categorical data an estimation of missing data was obtained by taking a modal value. An estimation of missing data on the continuous variables was obtained by taking a group mean (Tabachnick & Fidell, 1996) unless otherwise specified to leave blank as instructed in the scoring manual of the SF-36 (Ware, Snow, Kosinski, & Gande, 1993). An extreme outlier over the *z* score of 3.29 was found on the Duke Social Support Index so the case was deleted from further analysis.

Table 2 presents the descriptive statistics for the two standardised criterion variables SF-36 physical component and SF-36 mental component and the three predictor variables physical hours, passive hours and the Duke Social Support Index. The physical and mental components of the SF-36 were then compared to the Australian National Health Survey population norms (ABS, 1995). The mental component was found to be compatible with the Australian sample means (M=51.3) for all persons aged 55-75 years and over. The physical component in this study was found to be higher than the Australian sample (M=42.6). However both means fell within the 95% confidence level suggesting no significant difference in means.

Table 2

Means and Standard Deviations for All Variables

Variable	N	M	SD
SF-36 Physical	72	52.96	8.06
SF-36 Mental	72	52.08	9.79
Physical Activity	74	19.56	19.29
Passive Activity	74	105.06	73.18
Social Support	74	29.58	1.99

The assumption of normality was assessed for all variables through various graphical and statistical methods. In the physical component of the SF-36, the distribution was negatively skewed with positive kurtosis. The normality assumption was violated so it was decided to transform the variable (Tabachnick & Fidell, 1996). Due to negative skewness the variable was first reflected, then a square root transformation was applied. With an alpha level of .05 the normality assumption was then met and no outliers were found.

The mental component of the SF-36 distribution was negatively skewed with positive kurtosis. The Kolmogorov-Smirnov test also showed violation of the normality assumption so it was decided to transform the variable. Due to negative skewness the variable was first reflected then a square root transformation applied (Tabachnick & Fidell,

1996). With an alpha level of .05 the normality assumption was meet. No outliers with a *z* score over 3.29 were detected.

The physical hours variable was both positively skewed and peaked. The Kolmogorov – Smirnov test of normality was also violated. A square root transformation was undertaken (Tabachnick & Fidell, 1996). After transformation normality was assumed with alpha level of .05. No outliers were identified. The passive hours variable indicated small positive skewness and peakness however with an alpha of .05 the test of normality was not violated. No outliers over the *z* score of 3.29 were found.

The Duke Social Support Index distribution indicated negative skewness with large kurtosis. Viewing of the box plot and subsequent *z* scores identified an extreme outlier over a standardized score of 3.29. This case was then deleted from further analysis. The variable was then reflected and transformed using a square root (Tabachnick & Fidell, 1996). Although the normality test was still violated with an alpha level of .05 the skewness and kurtosis levels were reduced and the graphs indicated a more normal distribution with no outliers. As the study was of an exploratory nature it was decided to continue the analysis and interpret the results with caution (Tabachnick & Fidell).

To further explore the data and examine the association between variables a Pearson product-moment correlation was conducted with transformed variables (Appendix J). The assumptions of linearity and homoscedasticity were deemed to be adequately met.

Table 3 displays correlations among the transformed physical component of SF-36, transformed physical activity, passive activity and transformed DSSI. Two cases were missing on the physical component of the SF-36 variable. No other variables had cases missing. A weak relationship between the physical component of the SF-36 and physical hours was significant, $r(70) = -.318$, $p < .05$. As the physical component of the SF-36 was

reflected in transformation this relationship is interpreted as positive indicating that an increase in satisfaction with physical health is associated with an increase in total active hours. No other significant correlations were found.

Table 3
Correlations Among Transformed Physical Component of the SF-36, Transformed Physical Hours, Passive and Transformed Duke Social Support Index

	SF-36 Physical	Physical Activity	Passive Activity
Physical Activity	-.318**		
Passive Activity	.171	-.082	
Social Support	.101	-.115	-.031

** $p < .05$

Table 4 displays correlations among the transformed mental component of SF-36 transformed physical activity, passive activity and transformed DSSI. Two cases were missing on the mental component of the SF-36. No other variables had cases missing. No significant correlations were found.

Table 4
Correlations Among Transformed Mental Component of the SF-36, Transformed Physical Hours, Passive and Transformed Duke Social Support Index

	SF-36 Physical	Physical Activity	Passive Activity
Physical Activity	-.137		
Passive Activity	-.004	-.082	
Social Support	.111	-.115	-.031

All data was screened for assumptions in exploratory analysis and required transformation undertaken (see exploration of data section). In the transformed variables the assumptions of normality, linearity, homoscedasticity and independence of residuals was deemed appropriately met after viewing residual scatterplots. The assumptions of multicollinearity and singularity were met through analysis as SPSS defaults to non-admittance of variables, which violate these assumptions. With the use of $p < .001$ criterion for Mahalanobis distance no outliers among the cases were found. The ratio of cases to variable approximately 25:1 was deemed satisfactory for the purposes of this study.

Results

Physical Component SF-36

A standard multiple regression analysis was performed between the transformed criterion variable, being the physical health component of the SF-36 and the predictor variables of transformed physical hours, total passive hours and the transformed Duke Social Support Index (Appendix L). Table 5 displays the correlations between the variables, the unstandardized regression coefficients (B), the standardized regression coefficients (*B*), the semipartial correlations (sr^2), R^2, adjusted R^2 and R.

The results indicated that 13% (9% adjusted) of the variance in the physical component of the SF-36 could be explained by total physical hours, total passive hours and the Duke Social Support Index. R, for regression was significantly different from zero, $F(3,68) = 3.377$, $p < .05$.

Physical hours was the only predictor which contributed significantly to the variance ($p < .05$), with the number of physical hours uniquely predicting 9% ($sr^2 = .088$) of the variance. After taking into consideration reflection of the physical component SF-36 in

transformation the results indicated a significant positive relationship between physical hours and the physical component of the SF-36, that is as hours spent being active increased so did physical health status.

Table 5

Standard Multiple Regression of Transformed Physical Hours, Passive Hours and Transformed Duke Social Support Index on the Transformed Physical Component of the SF-36 (N=72)

	SF-36 Physical	Physical Activity	Passive Activity	B	β	sr^2
Physical Activity	-.318			-.130**	-.301	.088
Passive Activity	.171	-.059		2.241	.156	.024
Social Support	.101	-.120	-.040	.159	.071	.005
					R^2 =	.130
					Adjusted R^2 =	.091
					R =	.360**

** $p < .05$

Table 6

Standard Multiple Regression of Physical Hours, Passive Hours and Duke Social Support Index on the Physical Component of the SF-36 (N=72)

	SF-36 Physical	Physical Activity	Passive Activity	B	β	sr^2
Physical Activity	.283			.107**	.258	.065
Passive Activity	-.170	-.088		-1.685	-.153	.023
Social Support	.119	.117	.054	.392	.097	.009
					R2 =	.111
					Adjusted R^2 =	.071
					R =	.333**

** $p < .05$

To ensure the results from transformed data were robust, a standard multiple regression was then performed between all untransformed variables, the criterion variable being the physical component of the SF-36 and the predictor variables being physical activity, passive activity and the DSSI (Appendix L). Assumptions were not met for all variables except the total number of passive hours. Table 6 displays the correlations between the variables, the unstandardised regression coefficients (B), the standardised regression coefficients (*B*), the semipartial correlations (sr^2), R^2, adjusted R^2 and R.

The results indicated that 11% (7% adjusted) of the variance in the physical component of the SF-36 could be explained by the total number of physical hours, total

number of passive hours and the Duke Social Support Index. R, for regression was significantly different from zero, $F(3,68) = 2.818$, $p < .05$.

Physical hours was the only predictor which contributed significantly to the variance ($p < .05$), with the number of hours uniquely predicting 6% ($sr^2 = .065$) of the variance. The significant relationship between physical hours and the physical component of the SF-36 was positive indicating more hours spent in active activity was associated with an increase in physical health status.

Mental Component SF-36

A standard multiple regression analysis was performed between the transformed dependent variable SF-36 mental health component and the predictor variables transformed of physical hours, total passive hours and the transformed Duke Social Support Index (Appendix M). Table 7 displays the correlations between the variables, the unstandardised regression coefficients (B), the standardised regression coefficients (*B*), the semipartial correlations (sr^2), R^2, adjusted R^2 and R.

No significant results were found, R for regression was not significantly different from zero, $F(3,67) = .654$, $p < .05$. The results indicated that less than 3% (-1% adjusted) of the variance in the mental health component of the SF-36 could be explained by physical hours, passive hours and the Duke Social Support Index.

Table 7

Standard Multiple Regression of Transformed Physical Hours, Passive Hours and Transformed Duke Social Support Index on the Transformed Mental Component of the SF-36 (N=72)

	SF-36 Mental	Physical Activity	Passive Activity	B	β	sr^2
Physical Activity	-.137			-5.807	-.126	.015
Passive Activity	-.004	-.059		-1.126	-.007	.000
Social Support	.111	-.120	- .040	.226	.096	.009
					R^2 =	.028
					Adjusted R^2 =	.015
					R =	.167

Table 8

Standard Multiple Regression of Physical Hours, Passive Hours and the Duke Social Support Index on The Mental Component of the SF-36 (N=72)

	SF-36 Mental	Physical Activity	Passive Activity	B	β	sr^2
Physical Activity	.153			7.360	.146	.020
Passive Activity	-.019	-.088		-1.195	-.009	.000
Social Support	.073	.117	- .040	.276	.057	.003
					R2 =	.027
					Adjusted R^2 =	-.016
					R =	.163

To ensure that the results were robust from the transformed data, a standard multiple regression was then performed between all untransformed variables where the criterion variable was SF-36 mental component and the predictor variables physical hours, passive hours and the Duke Social Support Index (Appendix N). Assumptions were not met for all variables except the total passive hours. Table 8 displays the correlations between the variables, the unstandardised regression coefficients (B), the standardised regression coefficients (*B*), the semipartial correlations (sr^2), R^2, adjusted R^2 and R.

No significant results were found. R, for regression was not significantly different from zero, $F(3,68) = .618$, $p < .05$. The results indicated that less than 3% (2% adjusted) of the variance in the mental health component of the SF-36 could be explained by physical hours, passive hours and the Duke Social Support Index.

Discussion

The purpose of the present study was to explore the association between activity, social support and health-related quality of life. Standard multiple regressions were conducted to examine two research questions. The first question was, "how do physical activity, passive activity and social support interact with health-related quality of life?" The second question was "which is most important physical activity, passive activity or social support in predicting the mental and physical components of health-related quality of life?" The results of the study indicated that in combination physical activity, passive activity and social support were predictive of physical health-related quality of life. However, when considered for their unique contributions, physical activity was the only significant predictor of physical health-related quality of life. Although only explaining a small amount of the variance the relationship between physical activity and physical health-

related quality of life was found to be positive suggesting that as participation in physical activity increases an increase in physical health-related quality of life is also found.

Further support for the significant result was found in the untransformed analysis, which displayed the same patterns of association. In addition the strength and direction of relationships between physical activity, passive activity, social support and physical health status was also found in the correlations between the predictor variables and physical health status (Tabachnick & Fidell, 1996). Furthermore the low correlations between the predictor variables suggests interpretation of the results are less ambiguous with little variance being shared between predictors (Tabachnick & Fidell). No significant relationships were found between physical activity, passive activity, social support and mental health-related quality of life.

Physical Activity and Health-Related Quality of Life

The finding that physical activity was associated with physical health status was expected as the benefits of physical activity to health have often been found in the gerontology literature (McAuley & Rudolph, 1995). In particular studies investigating the association between physical activity and physical health outcomes have usually found a positive relationship (Lindgren, Svardsudd, & Tibblin, 1994). In evaluating the effectiveness of an exercise program implemented in a senior centre Wallace et al. (1998) used the SF-36 as an outcome measure. One hundred individuals aged over 65 years were allocated to either an intervention exercise program or a control group. The results indicated that after six months the intervention group's health-related quality of life increased significantly compared to the control group. Furthermore the random selection and experimental design of the study allowed for causational conclusions, suggesting that

the exercise program not only aided in the prevention of decline that otherwise may have prevailed among the elderly, but also enhanced physical and psychological functioning.

However, unlike the Wallace et al. (1998) study the present study found only a weak non-significant relationship between physical activity and mental health status. Other studies incorporating longer term exercise programs have also found a positive relationship between both physical activity and mental health outcomes (McAuley & Rudolph, 1995). Yet studies involving short term exercise programs or no exercise interventions, such as in the present study, have been less equivocal in their findings (Volden et al, 1990).

McAuley and Rudolph (1995) assert that such discrepancies in findings may be due to differences in methodology such as the intensity and duration of the physical activity. Blumenthal et al. (1989) found that low levels and moderate levels of activity seemed to yield little improvement in psychological wellbeing. In a randomly controlled study comparing low activity, medium activity and a waitlist control group, Blumenthal et al. found little association between any specific treatment condition and psychological changes.

McAuley and Courneya (1992) argued that greater exposure to exercise participation enhances perceptions of personal capabilities and increases self–efficacy which then in turn influences perceptions of wellbeing. In testing the relative importance of physical activity and self-efficacy to self rated health Parkatti et al. (1998) found that self efficacy was a stronger predictor of self rated health than physical activity. Perhaps shorter term exercise programs or the absence of any acute exercise intervention as is the case in the present study reduces the opportunity for these processes to occur, thus reducing the impact on psychological wellbeing. The current study's distribution of scores in physical activity displayed a large percentage of scores at zero or low physical activity. It may well

be that to have psychological benefit higher levels of physical activity are needed (Blumenthal et al.,1989; Moses et al., 1989). The baseline design of the present study with no exercise intervention may have reduced the effect size as only a weak positive association was found with physical activity and mental health-related quality of life in both the transformed and untransformed analysis. Thus potentially if higher levels of activity or an exercise intervention was implemented a stronger relationship may have existed. Obviously further research is needed in this area to ascertain the relationship between the level and intensity of physical activity and its benefit to mental wellbeing (McAuley & Rudolph, 1995).

A further argument regarding the ambiguity found in the benefits of physical activity to psychological wellbeing is the use of small non-representative clinical samples in some studies (Brown, 1992). In clinical samples physical activity has been found to decrease depression, anxiety and stress (Dustman, Emmerson, & Shearer, 1994; O'Connor, Aenchbacher, & Dishman, 1993). However, samples taken from the broader population have not found these results (Patrick et al., 1997). In a community sample Patrick, Ford, Mead, Chang, and Klag, (1997) found no relationship between levels of physical activity level and risks of developing depression and psychiatric distress. Furthermore some research has suggested that samples which exhibit already high levels of mental wellbeing such as the present study with above average Australian norms, display little or no association between physical activity and psychological wellbeing (Gitlin et al., 1992; Blumenthal et al., 1989).

Passive Activity and Health-Related Quality of Life

The current study found no significant relationship between passive activity and physical or mental health-related quality of life. The limited research exploring the benefits of passive activity with the elderly has also found equivocal results in relation to health benefits. Although in physical health-related quality of life a consistent negative relationship was found with passive activity in both the transformed and untransformed analysis the negative relationship found suggests that individuals with a lower physical health status may spend more time participating in passive activities. Everard (1999) found supporting results suggesting that activity-limiting health problems were negatively associated with wellbeing.

Results of the current study also indicated that the relationship between passive activity and mental status was extremely weak. Furthermore a discrepancy in the direction of association was observed between the transformed and untransformed analysis. Limited previous research exploring the benefits of activities other than physical have found unclear results in relation to health benefits (Ragheb & Griffith, 1982; Riddick & Daniel, 1984; Kelly et al., 1987). Russell (1987) argues that the discrepancies in activity research may be due to differences in the operational definitions of activity or outcome measures used.

Research investigating leisure activity has been plagued with numerous operational definitions and a range of differing activities such as spectator sports, mass media, home duties, volunteer work, and walking have all been included in various studies (Ragheb & Griffith, 1982; Riddick & Daniel, 1984). This makes comparison of results hazardous as various activities may influence wellbeing differently (Brown, 1992). Kelly et al. (1987) have measured activity in a similar manner to the present study using participation in community organisations such as church and clubs. The present study's sample was

selected through clubs and organisations and many of the passive activities measured were conducted through clubs and community organisations. Although the outcome measure was not the same as the present study Kelly et al. found similar results indicating no significant relationship between level of participation and subjective life satisfaction.

A common outcome measure utilised in previous research has been life satisfaction (Kelly et al., 1987; Ragheb and Griffith; 1982 Riddick & Daniel, 1984). It has been argued that life satisfaction is the cognitive component of wellbeing (Kercher, 1992) and strongly associated with health status (Palmore & Kivett, 1977). Ragheb & Griffith compared the relative importance of leisure participation and leisure satisfaction to life satisfaction of older persons. They found that leisure satisfaction contributed much more to life satisfaction than actual leisure participation. Furthermore Susman (1976) argues for activities to be satisfying and of benefit to an individual they need to maximise the use of the individual's abilities, be challenging, interesting and elicit pleasure. The qualitative elements of activity have been the focus of more recent research and some studies are suggesting that satisfaction with the activity, desirability of the activity and a sense of belonging related to an activity may moderate the relationship between activity and wellbeing (Everard, 1999). The nonsignficant results found in the present study may reflect inadequacies in the mental health status measurement to detect the qualitative aspects of the passive activities. Alternatively the types of passive activities measured in this study may not have provided these qualities to the participants resulting in the minimal association to mental health status.

Social Support and Health-related Quality of Life

Although an association between social support and perception of health has been found in previous research (Lindgren et al., 1994), no significant association between social support and health-related quality of life was found in the present study. Social support was however found to have a weak positive association with both the physical and mental components of health status. This result is similar to a conclusion reached following a meta-analytic review which found that social support only explains a relatively small variance of health outcome (Smith et al., 1994). The finding that physical activity was a stronger predictor of health outcomes than social support has also been previously found. The results of Unger et al. (1997) study suggested that the effects of physical activity were stronger than social interactions on functional decline.

However, the narrow range in scores and the absence of normal distribution in the social support scores may have attributed to the non-significant results. The low range in scores was evident in the absence of normal distribution within the social support scale and the small standard deviation found (SD = 1.99). After deletion of one significant outlier the range of scores on the Duke Social Support scale was between 24 –33. The available range is between 11-33. The restricted range of scores on DSSI could have impacted on the results, with the social support scores being too narrow to demonstrate any correlation with quality of life scores. Similar results to the present study were found by Lewis and Borders (1995) and a lack of variability in the social support scores was suggested as a possible reason why no such relationship was found.

Results found in previous studies suggest a positive association between social support and health, but these may not be comparable to other studies due to differences in operational definitions (Unger et al., 1997; Landerman et al., 1989). Comparison with

different operational or working definitions is difficult and rarely is the same measure used more than once in a study (Bowling, 1991). Unger et al. (1997) used the social support dimension number of social interactions and did not include satisfaction with social interactions as in the present study. Goodger et al. (1998) used the Duke Social Support Index and found a significant association between the DSSI, self rated health and quality of life. However, the study utilised a standard single item measure for self-rated health and quality of life and not a generic measure such as the SF-36 (Goodger et al.).

Research utilising both the DSSI and the SF-36 is extremely rare and little is known regarding the strengths of associations between the constructs measured by these instruments (Goodger, personal communication, August 29, 2000). In the present study, a very weak positive association between the DSSI and both components of the SF-36 was observed. Further research exploring the association between the DSSI and the SF-36 is needed to support or challenge the results of the present study.

Limitations

Despite the superior nature of random selection it has been rarely used in studies due to its cost and the time taken to implement (De Vaus, 1995). As the current study was of an exploratory nature and the aim of the study was to investigate the association between variables the sampling method was deemed appropriate. However, the non-random nature of the current study's participant selection and the naturally occurring manipulation of variables, limits the ability to imply causality between variables and only the degree of relationship can be inferred.

The overall amount of variance explained in the present study was smaller than expected. Only 13% of the variance in physical health-related quality of life was explained in the present study compared to Kelly et al. (1987) which found that 21% of the variance

in subjective wellbeing could be explained by leisure activities, personal and social resources. The non-random sampling method of this study may also have impacted on the range of scores found. Random selection of participants would have produced a larger representative sample and the range of scores may have increased, perhaps providing a larger degree of association between the predictor variables and health-related quality of life (De Vaus, 1995).

Inclusion of the elderly who are hospitalized and in residential care may have provided a more representative sample of the health levels in the elderly. The current study's sample were physically healthier in comparison to the SF-36 Australian norms (ABS, 1995). The present study was to be part of a bigger research project which proposed two parallel honours studies, one sampling from residential care and the other from the community. This would then have allowed for a large cross sectional study of the elderly population. Unfortunately only the results of this study are reported, resulting in a less representative sample of the elderly than anticipated. The non representative sample may have created the narrow range of scores found in some of the variables. A broader sample containing elderly with a wider range of health levels may have displayed stronger relationships between variables.

Furthermore although care was taken in the sampling procedure to target a broad range of participants from the general community, selection bias remained a major threat to external validity due to the use of a pool of volunteers (Gitlin et al., 1992). Sixty-three respondents came from the specific activity organisations. These participants represented a homogeneous group of individuals who were relatively active and perhaps more willing than other members of the community to participate in research and therefore may not be fully representative of the broader population (Wallace et al., 1998). Random sampling, in

future studies of other community dwellers and the inclusion of individuals in residential care would assist in reducing biases and allow for generalisability to the larger population.

A possible cohort effect may have also limited the ability to generalise the results to the broader community. Brown (1992) states that differences in mortality rates may suggest a possible cohort effect. Since 1966 individuals in the Busselton community have participated in a health study with repeated cross-sectional health surveys and interventions (Knuiman, Cullen, Bulsara, Welborn, & Hobbs, 1994). The mortality rates of these participants have been compared to the rates of mortality for individuals residing in the remainder of the Southwest region of Western Australia. A similar rate of decline in mortality rates for males was found over the period 1965 to 1989. However, in females ranging from 45 to 74 years the mortality rates declined at a faster rate in Busselton than in any other region of the Southwest. The results of the Busselton Health Study suggested a beneficial effect from the intervention programs on survival rates for females in the Busselton community (Knuiman et al., 1994).

Females who were eligible for the Busselton Health Study also met the age criteria for the present study and may have been included in the current sample. The majority of participants in the current study were females (70%) and the results from the Busselton Health Study suggest that females from this age group are generally healthier than for the rest of the Southwest region. Therefore caution must be taken when generalizing the results to other populations not experiencing similar community interventions such as those implemented by the Busselton Health Study. Furthermore the impact of the over representation of females in the current study, 70% compared to 53% in the normal Busselton population, (ABS, 1995) is uncertain and further investigation is needed to explore any possible effects.

Measurement issues

The activity profile in this study was produced for the sole purposes of this research and has not been psychometrically measured. Although a limiting factor psychometrically tested measures validated for use in the elderly are rare and most questionnaires used to assess activity have little evidence that they provide precise estimates of activity participation (O'Connor et al., 1993). Furthermore the activity profile utilised in the present study was produced in consultation with elderly individuals residing in the Busselton region and was thought to best capture the types of passive activities undertaken in this population.

The collection of data through self-report and the associated biases is acknowledged as a possible further limitation to this study. The method of reporting frequency of activity relies on memory and the accuracy of this memory process can be affected by age related changes in memory ability (Craik & McDowd, 1987). Data may have been lost from participants who found it hard to recall and calculate activities over the requested time of four weeks. This method of collection may therefore have biased responses towards those participants who have less trouble completing the questionnaires, that are perhaps more healthy, have better memory recall, more educated, or who have had more experience filling out mail surveys. However, recall is the most popular method in this area of research and some studies have suggested greater accuracy of recall over shorter rather than longer periods of time (Blair, 1984).

Statistical issues

The sample size and the corresponding ratio of number of cases to variables was also a possible limitation and may have influenced the results found for the unique contribution of each variable. Although the sample size was adequate for the number of

predictors when testing the overall significance of the multiple regression (Green, 1991), it has been argued that sample sizes should be larger when testing the unique significance of individual predictors (Green). Green suggests a minimum of 128 cases when using three predictor variables. Furthermore a higher case to criterion is needed when the predictor variables are skewed (as in all but the passive activity variable), a small effect size is anticipated, or large measurement error is expected from unreliable variables (Tabachnick & Fidell, 1996).

The sample size of the current study was under the number of participants needed when exploring unique contributions of predictors. A larger sample may have given the analysis more power and the trends shown in the unique contributions of predictor variables may have reached significance. Although an appropriate sample size was aimed for in the current study a lower than anticipated response rate was gained.

Implications of Study's Findings and Directions for Future Research

Notwithstanding the limitations inherent in this study, the finding that physical activity is associated with physical health-related quality of life in older people may have important implications for health programs in the Busselton region. The results suggest that participation in physical activity is important to the physical wellbeing of the elderly. Thus organisations with an elderly membership should be encouraged and supported to offer a variety of programs, which focus on physical activity. Education programs emphasizing the importance of physical activity to physical health-related quality of life might also be an important focus for health promotion in the elderly.

Although the results of exercise intervention studies have suggested a positive association between physical activity and psychological benefit, this retrospective study found no significant association between activity and mental health-related quality of life.

This study supports previous research suggesting that the association between activity and positive mental health is equivocal and other factors may mediate the benefits of activity to mental wellbeing. The benefits of physical activity to mental health may only be apparent in high levels of intensity thus health promotion organisations may need to offer higher levels of physical activity. Exploration of the constraints and identification of the reasons why older people decline to participate in physical activity is needed to address issues of inactivity

The negative association between passive activity and physical health status raises important questions regarding the ideology of Activity theory. Purely participating in passive activities may not always be beneficial to health and in fact may be detrimental to physical health outcomes. Activities need to be both interesting and challenging to participants. Recipients of elderly health promotion should be consulted regarding the types of activities to be offered. Further exploration of the processes, which enhance psychological wellbeing, and mental health-related quality of life is essential for the development of health in the elderly. Future research exploring the qualitative nature of activities and focusing on mediators such as self efficacy, feelings of mastery, and sense of belonging will also help to gain understanding of the complexities involved in the enhancement of wellbeing and may have important implications for the implementation and delivery of health interventions.

Commonality of measures used in future studies could also benefit the advancement of knowledge regarding the importance of particular variables to the enhancement of health in the elderly. Past health outcomes have been narrow in scope and the generic form of the SF-36 has been suggestive of being beneficial to the advancement of holistic health measurement. Furthermore it has been thoroughly psychometrically tested and validated

with an elder population. The DSSI encompasses both a subjective and objective scale measuring dimensions of social support found to be influential in health and wellbeing. However, limited research has explored the association of the constructs being measured by these instruments. Further research combining both these instruments will help clarify whether the relationships of the constructs being measured are of benefit to the health status of the elderly.

Future research needs to address the generalisability concerns inherent in this study and many other studies in this area (Gitlin et al., 1992). Broader samples representing the entire continuum of wellbeing from the least functional such as elderly who reside in nursing homes to the most functional and able is needed. Given the large variability of health status in the elderly many studies representing various groups of elderly are needed if any clarity is to emerge as to the benefits of activity to the elderly as a whole.

Conclusion

The present study supports the claim that physical activity, is associated with physical health-related quality of life in people who are 60 years of age and older. The results of the study challenge previous conceptions of ageing being a period of decline and poor health. Rather the present study suggests that participation in physical activity is related to an increase in physical health status. However, higher levels of physical activity and challenging activities may need to be offered in order to achieve maximum benefit to elderly individuals and their health-related quality of life.

With a worldwide trend towards an older population this finding has important implications for the management and health care of older people. In the past large portions of the health care budget has been spent on this aged group. Health and welfare agencies

have identified the aged as a high priority group and physical activity has been found to be associated with positive health outcomes. Thus the delivery of high intensity exercise programs to those who are sixty years of age and older may mean reduced disability and a longer 'successful' and functional life.

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Footnote

[1]The purpose of this study was to ascertain the relationship between levels of activity and social support on health-related quality of life. The original, proposed, (dated 14th August 2000) design was to divide time spent in activity into a high or low activity groups and a high or low social support groups. High/low allocation was to be determined by using a median split of activity level and social support score. For example those lower than the median for activity level were to be allocated to the low-level group, those higher than the median to the high-level activity group. The study would then employ a between-group design with two independent variables (activity and social support) and one dependent variable (quality of life). A 2 x 2 between - subjects factorial Analysis of Variance (ANOVA) was then to be conducted on the data with levels of the independent variables being either high or low.

However after initial exploratory analysis it was decided to conduct Multiple Regression rather than ANOVA as this analysis may be more sensitive to the data. Furthermore total hours of activity was also suspected as being too broad a measurement and not sensitive enough for analysis so it was also decided to divide total activity hours into two subscales of physical activity and passive activity.

Appendix A (i)

Demographic Sheet

Participant No_____ Date in Full_____

Age_____ Sex_____

Date of Birth_____

Month of Birth_____

Year of Birth_____

What is the name and address of the establishment you are currently in?

Name_____

Address_____

Town_____

Nationality_____

Name of current Prime Minister_____

Martial Status: (Please Circle)

Married Defacto Widowed Divorced Unmarried

Level of Formal Education: (Please Circle)

Primary High school or Equivalent University or Equivalent Other

Main Previous Occupation: (Please Circle)

Home Duties Manual Work Professional Work Other

Main Previous Occupation of Spouse: (Please Circle)

Home Duties Manual Work Professional Work Other

Are you currently on any medication? _____

If you are on medication, what is it for?

_____

_____

_____

_____

_____

Do you suffer from any of the following conditions? : (Please Circle)

Deafness

Blindness

Wheelchair Bound

Require walking Aides

Paralysis

Speech Difficulties

Breathing Difficulties

Arthritis

Hip Replacement

Parkinson's

Osteorthritis

Heart Problems

Diabetes

Peripheral Vascular Disease eg. Arteriosclerosis or Atherosclerosis

Nervous Conditions

Other_____

_____

_____

_____

_____

Appendix A (ii)

Demographic Sheet

Participant No_____ Date in Full_____

Age_____ Sex_____

Date of Birth_____

Month of Birth_____

Year of Birth_____

Nationality_____

Martial Status: (Please Circle)

Married Defacto Widowed Divorced Unmarried

Level of Formal Education: (Please Circle)

Primary High school or Equivalent University or Equivalent Other

Main Previous Occupation: (Please Circle)

Home Duties Manual Work Professional Work Other

Main Previous Occupation of Spouse: (Please Circle)

Home Duties Manual Work Professional Work Other

Are you currently on any medication? _____

If you are on medication, what is it for?

_____

_____

_____

_____

_____

Do you suffer from any of the following conditions? : (Please Circle)

Deafness

Blindness

Wheelchair Bound

Require walking Aides

Paralysis

Speech Difficulties

Breathing Difficulties

Arthritis

Hip Replacement

Parkinson's

Osteorthritis

Heart Problems

Diabetes

Peripheral Vascular Disease eg. Arteriosclerosis or Atherosclerosis

Nervous Conditions

Other_____

_____

_____

_____

_____

_____

Appendix B

Activities Profile

Please fill in each space with the number of HOURS over the last FOUR WEEKS you have spent on these activities.

ACTIVITY	TOTAL HOURS SPENT
Bowls	
Cycling	
Golf	
Riding	
Walking	
Tai Chi	
Yoga	
Swimming	
Badminton	
Tennis	
Fishing	
Boating	
Water Aerobics	
Gardening	
Traveling	
General Home Duties	
Paid Work	
Volunteer Work	
Cultural Outings	
Church	
Play Writing	

ACTIVITY	TOTAL HOURS SPENT
TAFE or University	
Book Reading	
Poetry Reading	
Entertaining	
Watching TV	
Bingo	
Board Games	
Card Games	
Art Work	
Craft Work	
Carpentry	
Mechanics	

Please list any other activities you have be involved in over the last month.

Appendix C

Dukes Social Support Index

1) How many persons in this area within one hour's travel (from your home/here) do you feel you can depend on or feel very close to? Do not include people in your own family.

_____

2) How many times during the past week did you spend some time with someone who does not live with you? For example, you went to see them or they came to visit you, or you went out together?

a) none
b) one time
c) two times
d) three times
e) four times
f) five times
g) six times
h) seven times or more

3) How many times did you talk to some friends, relatives or others on the telephone in the past week (either they called you, or you called them)?

a) none
b) one time
c) two times
d) three times
e) four times
f) five times
g) six times
h) seven times or more

4) About how often did you go to meetings of social clubs, religious meetings or other groups that you belong to in the past week?

a) none
b) one time
c) two times
d) three times
e) four times
f) five times
g) six times
h) seven times or more

5) Does it seem that your family and friends (i.e. people who are important to you) understand you?

a) hardly ever
b) some of the time
c) most of the time

6) Do you feel useful to your family and friends (i.e. people important to you)?

a) hardly ever
b) some of the time
d) most of the time

7) Do you know what is going on with your family and friends?

a) hardly ever
b) some of the time
c) most of the time

8) When you are talking with your family and friends, do you feel you are being listened to?

a) hardly ever
b) some of the time
c) most of the time

9) Do you feel you have a definite role in your family and among your friends?

a) hardly ever
b) some of the time
c) most of the time

10) Can you talk about your deepest problems with at least some of your family and friends?

a) hardly ever
b) some of the time
c) most of the time

11) How satisfied are you with the kinds of relationships you have with your family and friends?

a) hardly ever
b) some of the time
c) most of the time

Appendix D

Health-Related Quality Of Life

Please answer every question by circling the appropriate number next to your answer. If you are unsure about how to answer a question, please give the closest answer to how you feel.

The questions on the first page ask only about NOW - how your health is NOW and about how your health limits certain activities NOW

1 In general, would you say your health is
(Circle one number only)

Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

2 Compared to one year ago, how would you rate your health in general now?
(Circle one number only)

Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same as one year ago	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

3 The following questions are about activities you might do during a typical day. Does YOUR HEALTH NOW LIMIT YOU in these activities? If so, how much?
(Circle one number on each line)

		Yes limited a lot	Yes limited a little	No not limited at all
a	VIGOROUS ACTIVITIES, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b	MODERATE ACTIVITIES, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c	Lifting or carrying groceries	1	2	3
d	Climbing SEVERAL flights of stairs	1	2	3
e	Climbing ONE flight of stairs	1	2	3
f	Bending, kneeling or stooping	1	2	3
g	Walking MORE THAN ONE kilometre	1	2	3
h	Walking HALF a kilometre	1	2	3
i	Walking 100 metres	1	2	3
j	Bathing or dressing yourself	1	2	3

4 During THE PAST 4 WEEKS, have you had any of the following problems with your work (including your work outside the home and housework) or other regular daily activities AS A RESULT OF YOUR PHYSICAL HEALTH?
(Circle one number on each line)

		Yes	No
a	Cut down on the amount of time you spent on work or other activities	1	2
b	Accomplished less than you would like	1	2
c	Were limited in the kind of work or other activities	1	2
d	Had difficulty performing the work or other activities (for example it took extra effort)	1	2

5 During the PAST 4 WEEKS, have you had any of the following problems with your work or other regular daily activities AS A RESULT OF ANY EMOTIONAL PROBLEMS (such as feeling depressed or anxious)?
(Circle one number on each line)

		Yes	No
a	Cut down on the amount of time you spent on work or other activities	1	2
b	Accomplished less than you would like	1	2
c	Didn't do work or other activities as carefully as usual	1	2

6 During the PAST 4 WEEKS, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?
(Circle one number only)

Not at all	1
Slightly	2
Moderately	3
Quite a bit	4
Extremely	5

7 How much BODILY pain have you had during the PAST 4 WEEKS?
(Circle one number only)

No bodily pain	1
Very mild	2
Mild	3
Moderate	4
Severe	5
Very severe	6

8 During the past four weeks, how much did PAIN interfere with your normal work (including both work outside the home and housework)?
(Circle one number only)

Not at all	1
A little bit	2
Moderately	3
Quite a bit	4
Extremely	5

For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the PAST 4 WEEKS
(Circle one number on each line)

		All of the time	Most of the time	A Good bit of the time	Some of the time	A Little of the time	None of the time
a	Did you feel full of life	1	2	3	4	5	6
b	Have you been a very nervous person	1	2	3	4	5	6
c	Have you felt so down in the dumps that nothing could cheer you up	1	2	3	4	5	6
d	Have you felt calm and peaceful	1	2	3	4	5	6
e	Did you have a lot of energy	1	2	3	4	5	6
f	Have you felt down	1	2	3	4	5	6
g	Did you feel worn out	1	2	3	4	5	6
h	Have you been a happy person	1	2	3	4	5	6
i	Did you feel tired	1	2	3	4	5	6

10 During the PAST 4 WEEKS, how much of the time has your PHYSICAL HEALTH OR EMOTIONAL PROBLEMS interfered with your social activities (like visiting friends, relatives, etc)?
(Circle one number only)

All of the time	1
Most of the time	2
Some of the time	3
A little of the time	4
None of the time	5

11 How TRUE or FALSE is EACH of the following statements for you?
(Circle one number on each line)

		Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a	I seem to get sick a little easier than other people	1	2	3	4	5
b	I am as healthy as anybody I know	1	2	3	4	5
c	I expect my health to get worse	1	2	3	4	5
d	My health is excellent	1	2	3	4	5

Appendix E

Letter To Organisation

Dear President

RE: RESEARCH PROJECT
I am currently a student at Edith Cowan University (Bunbury Campus) completing my fourth year Honours degree in Psychology. Part of my course work involves a research project involving people who are sixty years of age or older. The aim of the research is to explore the relationships between activity, social support and health-related quality of life in this particular age group. It is hoped that the results of the project may lead to a better understanding of activity and social support, and health-related quality of life. The research has been approved and ethical clearance given by the Ethics Committee for the School of Psychology, Edith Cowan University.

To access the participants needed for this research I am asking permission from your organisation to approach members on site at a day which is convenient (see attached organisation permission sheet and enclosed addressed envelope). I then intend to hand out information sheets and consent forms to individuals who are sixty years of age or older and ascertain whether they will give their permission to participate. Participation will involve answering some questionnaires and will take approximately half an hour. I plan to commence this process in the first week of October 2000. I can be contacted at the below telephone number and address for any questions you have regarding this research or alternatively you can contact either of my two supervisors listed below.

Thank you for your consideration

Researcher
Ms Jacky Ebbott
School of Psychology
Edith Cowan University
Bunbury Campus
BUNBURY WA 6231

Supervisor
Dr Ken Robinson
School of Psychology
Edith Cowan University
Bunbury Campus
BUNBURY WA 6231
1 800 993 323

Supervisor
Ms Deb Dawson
School of Psychology
Edith Cowan University
Bunbury Campus
BUNBURY WA 6231
08 9780 7797

Permission Form

DATE_____

ORGANISATION NAME_____

PERMISSION GIVEN
BY_____

CONTACT NAME AND PHONE
NUMBER_____

_____

MOST CONVIENENT TIME AND DAY TO CONDUCT
RESEARCH_____

_____

Appendix F (i)

Information Sheet

Community Participant

Dear Sir/Madam,

I am currently a student at Edith Cowan University (Bunbury Campus) completing my fourth year Honours degree in Psychology. Part of my course work involves a research project involving people who are sixty years of age or older. The aim of the research is to explore the relationships between activity, social support and health-related quality of life in this particular age group. It is hoped that the results of the project may lead to a better understanding of the benefits of activity and social support to health-related quality of life. The research has been approved and ethical clearance has been given by the Ethics Committee for the School of Psychology, Edith Cowan University.

You will be asked to fill out several questionnaires and some general demographic details. It is expected that this will take approximately half an hour. The information you provide will be kept confidential. Although your responses will be analysed to provide data for a research report and will be published, no individual will be identified. After completion of the questionnaires please seal them in the addressed envelope provided and either hand them back to the researcher or post them within a week. It is hoped that all questionnaires will be completed and returned by the fourth week in October 2000.

Please note you are under no obligation to participate in this project. Furthermore you can refuse to answer any questions and ask to withdraw at any time. Should you have any concerns or questions you can contact either my supervisors or myself.

Researcher
Ms Jacky Ebbott
School of Psychology
Edith Cowan University
Bunbury Campus

Supervisor
Dr Ken Robinson
School of Psychology
Edith Cowan University
Bunbury Campus
1 800 993 323

Supervisor
Ms Deb Dawson
School of Psychology
Edith Cowan University
Bunbury Campus
08 9780 7797

Appendix F (ii)

Information Sheet

GP Participant

Dear Sir/Madam,

I am currently a student at Edith Cowan University (Bunbury Campus) completing my fourth year Honours degree in Psychology. Part of my course work involves a research project involving people who are sixty years of age or older. The aim of the research is to explore the relationships between activity, social support and health-related quality of life in this particular age group. It is hoped that the results of the project may lead to a better understanding of the benefits of activity and social support to health-related quality of life. The research has been approved and ethical clearance has been given by the Ethics Committee for the School of Psychology, Edith Cowan University.

You will be asked to fill out several questionnaires and some general demographic details. It is expected that this will take approximately half an hour. The information you provide will be kept confidential. Although your responses will be analysed to provide data for a research report and will be published, no individual will be identified. After completion of the questionnaires please seal them in the addressed envelope provided and post them within a week. It is hoped that all questionnaires will be completed and returned by the fourth week in October 2000.

Please note you are under no obligation to participate in this project. Furthermore you can refuse to answer any questions and ask to withdraw at any time. Should you have any concerns or questions you can contact either my supervisors or myself.

Researcher
Ms Jacky Ebbott
School of Psychology
Edith Cowan University
Bunbury Campus

Supervisor
Dr Ken Robinson
School of Psychology
Edith Cowan University
Bunbury Campus
1 800 993 323

Supervisor
Ms Deb Dawson
School of Psychology
Edith Cowan University
Bunbury Campus
08 97807 797

Appendix G

Participant Consent Form

I .....hereby certify that I have read the attached information sheet and was given adequate opportunity to access further information. I understand the content of the information sheet and the implications of this study. I agree to participate in this research, understanding that I may refuse to answer questions and may withdraw my participation at any time. I understand that my name will not be used and I will not be identifiable in any publication that results from the research.

Date _____

Participant _____

Appendix H

Letter To General Practitioner

Dear General Practitioner

RE: RESEARCH PROJECT

I am currently a student at Edith Cowan University (Bunbury Campus) completing my fourth year Honours degree in Psychology.

My course work involves a research project involving people who are sixty years of age or older (see attached abstract from research proposal). The aim of the research is to explore the relationships between activity, social support and health-related quality of life in this particular age group. It is hoped that the results of the project may lead to a better understanding of the benefits of social support and being active.

The research has been approved and ethical clearance given by the Ethics Committee for the School of Psychology, Edith Cowan University. Confidentiality is ensured at all times and no names or addresses will be asked for.

Data collection for the research is to commence in the first week of October 2000 and to be completed by the end of October 2000.

To access the wide range of participants needed for this research I am asking for GP's support in identifying 50 appropriate participants from their clientele base and distributing the questionnaire packages to them. Appropriate participants are adults aged sixty years or older who are able to give informed consent to the study.

Your support for this project would be much appreciated and in return access to the data base will be granted. I can be contacted at the below address for any questions you have regarding this research or alternatively you can contact either of my two supervisors listed below.

Thank you for your consideration

Researcher
Ms Jacky Ebbott
School of Psychology
Edith Cowan University
Bunbury Campus

Supervisor
Dr Ken Robinson
School of Psychology
Edith Cowan University
Bunbury Campus
1 800 993 323

Supervisor
Ms Deb Dawson
School of Psychology
Edith Cowan University
Bunbury Campus
08 9780 7797

Attached Abstract From Research Proposal

What is The Relationship Between Activity, Social Support and Health-Related Quality of Life in People Who are Sixty Years of Age and Older.

Abstract

Improvements in medical technology, public health practices and changes in health behaviour have all been identified as being major contributors to the increasing size of the aged population. However one third of individuals over sixty have health conditions which limit their ability to live an independent and active life. Therefore an important goal of health care providers is to identifying behavioural factors which encourage well being and quality of life in this age group. The purpose of the proposed study is to explore the potential effects of activity and social support on health-related quality of life. The aim is to ascertain whether activity and social support in the aged, are associated with health-related quality of life. Level of activity, measured by number of activities performed over a month, and level of social support, measured on the Duke Social Support Index (DSSI) will be the independent variables. The dependent variable, health-related quality of life will be measured by the Short Form 36 scale. Results will be analysed using a 2 x 2 between subjects analysis of variance. A main effect for activity is hypothesised as is a main effect for social support. A significant interaction is also expected between high levels of activity, and high levels of social support. Further post hoc analysis using Tukeys HSD test will then be conducted to explore significant interactions between all cell means. The expected results will give support towards a preventative health care model and provide further evidence for the encouragement of activity and social support in health promotion programs.

Appendix I

Letter From General Practitioner

Peel/South West Division
Of General Practice Ltd

4th October, 2000

To Prospective Survey Participants:

Local General Practitioners are assisting with a research project which explores the relationship between activity, social support and health related quality of life in the over 60 years age group. It is hoped that the results of the project may lead to a better understanding of the benefits of social support and remaining active.

Your name and address has been randomly chosen from the appropriate age group and your General Practitioner has confirmed that you would be able to give informed consent to participation in this study. Confidentiality is ensured at all times and the surveys are returned anonymously to the researcher.

Please be aware that you completely free to decide whether to complete the survey or not. An explanatory letter is enclosed within the questionnaire, you are free to make your own decision regarding participation at all times.

Busselton District Hospital, Mill Road, BUSSELTON WA 6280
Postal Address: Locked Bag 3
PH; (08) 97543662 Fax: (08) 97524835 email:busselton.office@peelswdgp.com.au
Funded by the Commonwealth Department of Health and Aged Care

Appendix J

Correlations of Transformed Variables

Correlations

Correlations

		TRANPCSA	TRANPHYH	PASHRS	TRANSDSS
TRANPCSA	Pearson Correlation	1	-.318**	.171	.101
	Sig. (2-tailed)	.	.006	.151	.398
	N	72	72	72	72
TRANPHYH	Pearson Correlation	-.318**	1	-.082	-.115
	Sig. (2-tailed)	.006	.	.489	.327
	N	72	74	74	74
PASHRS	Pearson Correlation	.171	-.082	1	-.031
	Sig. (2-tailed)	.151	.489	.	.794
	N	72	74	74	74
TRANSDSS	Pearson Correlation	.101	-.115	-.031	1
	Sig. (2-tailed)	.398	.327	.794	.
	N	72	74	74	74

**. Correlation is significant at the 0.01 level (2-tailed).

Nonparametric Correlations

Correlations

			TRANPCSA	TRANPHYH	PASHRS	TRANSDSS
Spearman's rho	TRANPCSA	Correlation Coefficie	1.000	-.255*	.103	.090
		Sig. (2-tailed)	.	.030	.391	.452
		N	72	72	72	72
	TRANPHYH	Correlation Coefficie	-.255*	1.000	-.132	-.099
		Sig. (2-tailed)	.030	.	.264	.403
		N	72	74	74	74
	PASHRS	Correlation Coefficie	.103	-.132	1.000	-.022
		Sig. (2-tailed)	.391	.264	.	.854
		N	72	74	74	74
	TRANSDSS	Correlation Coefficie	.090	-.099	-.022	1.000
		Sig. (2-tailed)	.452	.403	.854	.
		N	72	74	74	74

*. Correlation is significant at the .05 level (2-tailed).

Appendix K

Physical Health Component:

Regression Analysis Transformed Variables

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
TRANPCSA	3.6490	1.04833	72
TRANPHYH	3.6529	2.41882	72
PASHRS	106.9342	73.04520	72
TRANSDSS	2.0491	.46997	72

Correlations

		TRANPCSA	TRANPHYH	PASHRS	TRANSDSS
Pearson Correlation	TRANPCSA	1.000	-.318	.171	.101
	TRANPHYH	-.318	1.000	-.059	-.120
	PASHRS	.171	-.059	1.000	-.040
	TRANSDSS	.101	-.120	-.040	1.000
Sig. (1-tailed)	TRANPCSA	.	.003	.076	.199
	TRANPHYH	.003	.	.311	.158
	PASHRS	.076	.311	.	.368
	TRANSDSS	.199	.158	.368	.
N	TRANPCSA	72	72	72	72
	TRANPHYH	72	72	72	72
	PASHRS	72	72	72	72
	TRANSDSS	72	72	72	72

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TRANSDSS, PASHRS, TRANPHYH[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: TRANPCSA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.360[a]	.130	.091	.99934

a. Predictors: (Constant), TRANSDSS, PASHRS, TRANPHYH

b. Dependent Variable: TRANPCSA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.119	3	3.373	3.377	.023[a]
	Residual	67.910	68	.999		
	Total	78.029	71			

a. Predictors: (Constant), TRANSDSS, PASHRS, TRANPHYH

b. Dependent Variable: TRANPCSA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	3.559	.620		5.738	.000			
	TRANPHY	-.130	.049	-.301	-2.633	.010	-.318	-.304	-.298
	PASHRS	241E-03	.002	.156	1.376	.173	.171	.165	.156
	TRANSDS	.159	.254	.071	.626	.533	.101	.076	.071

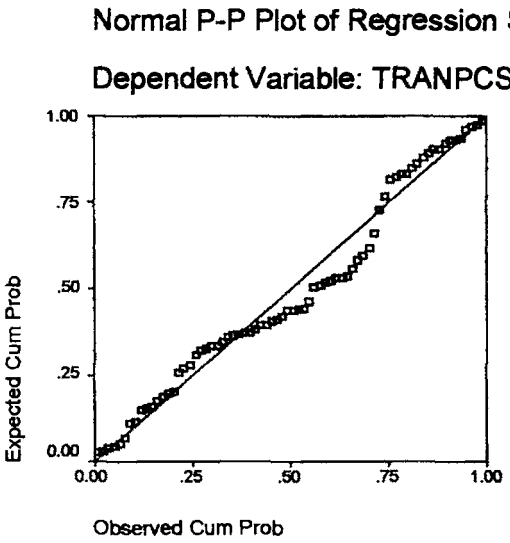
a. Dependent Variable: TRANPCSA

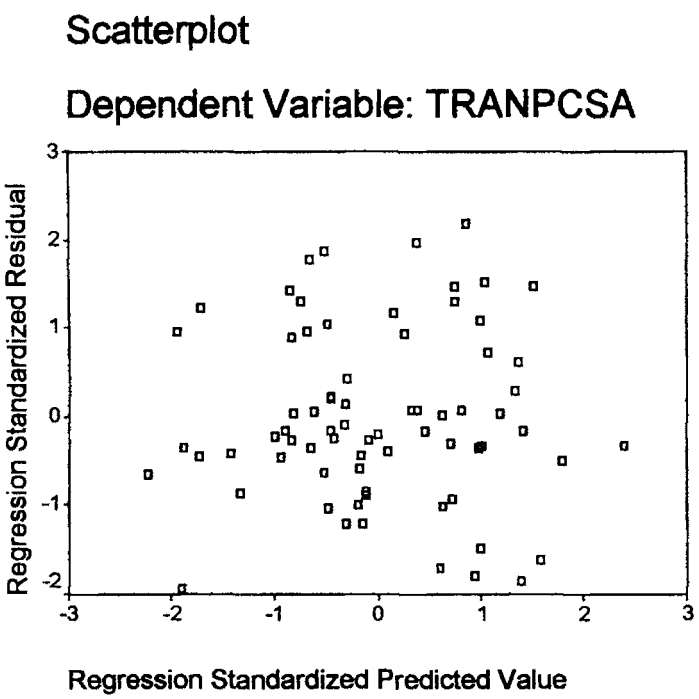
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8050	4.5498	3.6490	.37752	72
Std. Predicted Value	-2.236	2.386	.000	1.000	72
Standard Error of Predicted Value	.11984	.40648	.22687	.06380	72
Adjusted Predicted Value	2.8418	4.6013	3.6427	.38375	72
Residual	-1.9290	2.1797	.0000	.97799	72
Std. Residual	-1.930	2.181	.000	.979	72
Stud. Residual	-2.009	2.254	.003	1.010	72
Deleted Residual	-2.0886	2.3279	.0063	1.04257	72
Stud. Deleted Residual	-2.056	2.326	.005	1.022	72
Mahal. Distance	.035	10.760	2.958	2.248	72
Cook's Distance	.000	.135	.017	.028	72
Centered Leverage Value	.000	.152	.042	.032	72

a. Dependent Variable: TRANPCSA

Charts


Normal P-P Plot of Regression Standardiz
Dependent Variable: TRANPCSA
Expected Cum Prob
Observed Cum Prob
0.00
.25
.50
.75
1.00


Scatterplot
Dependent Variable: TRANPCSA
Regression Standardized Residual
Regression Standardized Predicted Value
-3
-2
-1
0
1
2
3

Appendix L

Physical Health Component:

Regression Analysis Untransformed Variables

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
PCSA	52.9612	8.06423	72
PHYHRS	19.1132	19.36934	72
PASHRS	106.9342	73.04520	72
RDSALL2	29.5833	2.00527	72

Correlations

		PCSA	PHYHRS	PASHRS	RDSALL2
Pearson Correlation	PCSA	1.000	.283	-.170	.119
	PHYHRS	.283	1.000	-.088	.117
	PASHRS	-.170	-.088	1.000	.054
	RDSALL2	.119	.117	.054	1.000
Sig. (1-tailed)	PCSA	.	.008	.077	.159
	PHYHRS	.008	.	.231	.165
	PASHRS	.077	.231	.	.325
	RDSALL2	.159	.165	.325	.
N	PCSA	72	72	72	72
	PHYHRS	72	72	72	72
	PASHRS	72	72	72	72
	RDSALL2	72	72	72	72

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	RDSALL2, PASHRS, PHYHRS[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: PCSA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.071	7.77130

a. Predictors: (Constant), RDSALL2, PASHRS, PHYHRS

b. Dependent Variable: PCSA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	510.527	3	170.176	2.818	.045[a]
	Residual	4106.734	68	60.393		
	Total	4617.261	71			

a. Predictors: (Constant), RDSALL2, PASHRS, PHYHRS

b. Dependent Variable: PCSA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	41.118	13.665		3.009	.004			
	PHYHRS	.107	.048	.258	2.231	.029	.283	.261	.255
	PASHRS	1.69E-02	.013	-.153	-1.327	.189	-.170	-.159	-.152
	RDSALL2	.392	.464	.097	.844	.401	.119	.102	.097

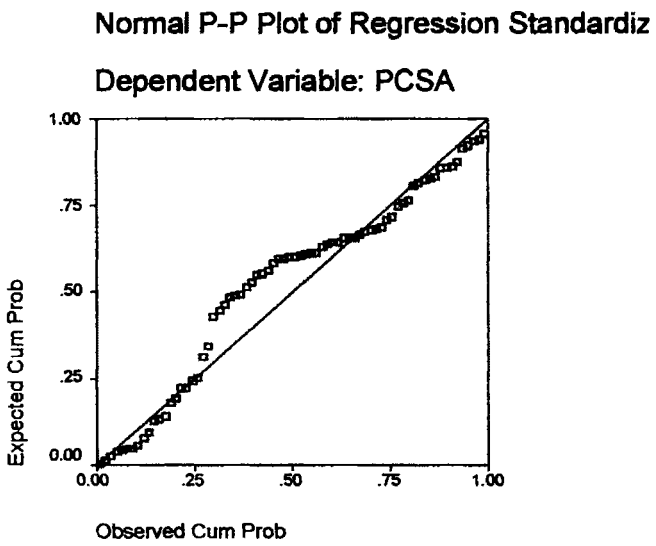
a. Dependent Variable: PCSA

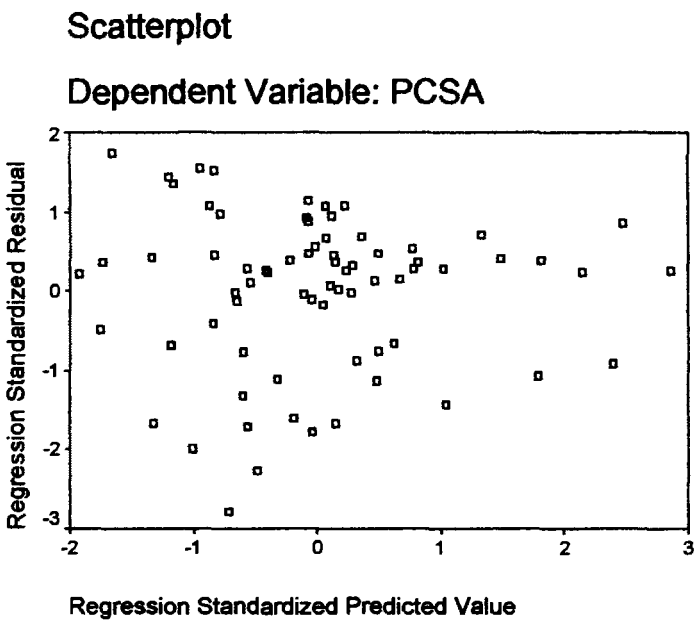
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	47.8172	60.6427	52.9612	2.68151	72
Std. Predicted Value	-1.918	2.865	.000	1.000	72
Standard Error of Predicted Value	.98881	3.13447	1.74288	.56745	72
Adjusted Predicted Value	46.5131	60.2825	53.0106	2.74723	72
Residual	-21.5775	13.4758	.0000	7.60535	72
Std. Residual	-2.777	1.734	.000	.979	72
Stud. Residual	-2.857	1.859	-.003	1.010	72
Deleted Residual	-22.8520	15.4919	-.0494	8.11410	72
Stud. Deleted Residual	-3.024	1.894	-.009	1.027	72
Mahal. Distance	.163	10.564	2.958	2.668	72
Cook's Distance	.000	.156	.017	.032	72
Centered Leverage Value	.002	.149	.042	.038	72

a. Dependent Variable: PCSA

Charts


Normal P-P Plot of Regression Standardiz
Dependent Variable: PCSA
Expected Cum Prob
Observed Cum Prob
0.00
.25
.50
.75
1.00


Scatterplot
Dependent Variable: PCSA
Regression Standardized Residual
Regression Standardized Predicted Value
2
1
0
-1
-2
-3
3

Appendix M

Mental Health Component:

Regression Analysis Transformed Variables

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
TRANMCSA	4.2251	1.11123	72
TRANPHYH	3.6529	2.41882	72
PASHRS	106.9342	73.04520	72
TRANSDSS	2.0491	.46997	72

Correlations

		TRANMCSA	TRANPHYH	PASHRS	TRANSDSS
Pearson Correlation	TRANMCSA	1.000	-.137	-.004	.111
	TRANPHYH	-.137	1.000	-.059	-.120
	PASHRS	-.004	-.059	1.000	-.040
	TRANSDSS	.111	-.120	-.040	1.000
Sig. (1-tailed)	TRANMCSA	.	.125	.487	.176
	TRANPHYH	.125	.	.311	.158
	PASHRS	.487	.311	.	.368
	TRANSDSS	.176	.158	.368	.
N	TRANMCSA	72	72	72	72
	TRANPHYH	72	72	72	72
	PASHRS	72	72	72	72
	TRANSDSS	72	72	72	72

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TRANSDSS, PASHRS, TRANPHYH[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: TRANMCSA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.167[a]	.028	-.015	1.11944

a. Predictors: (Constant), TRANSDSS, PASHRS, TRANPHYH

b. Dependent Variable: TRANMCSA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.459	3	.820	.654	.583[a]
	Residual	85.214	68	1.253		
	Total	87.673	71			

a. Predictors: (Constant), TRANSDSS, PASHRS, TRANPHYH

b. Dependent Variable: TRANMCSA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	3.985	.695		5.736	.000			
	TRANPHYH	-5.81E-02	.055	-.126	-1.047	.299	-.137	-.126	-.125
	PASHRS	-1.13E-04	.002	-.007	-.062	.951	-.004	-.007	-.007
	TRANSDSS	.226	.285	.096	.794	.430	.111	.096	.095

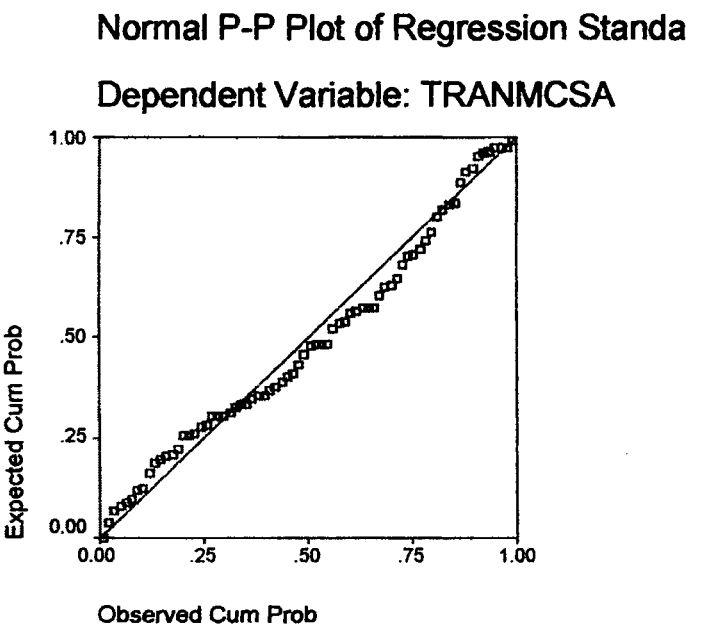
a. Dependent Variable: TRANMCSA

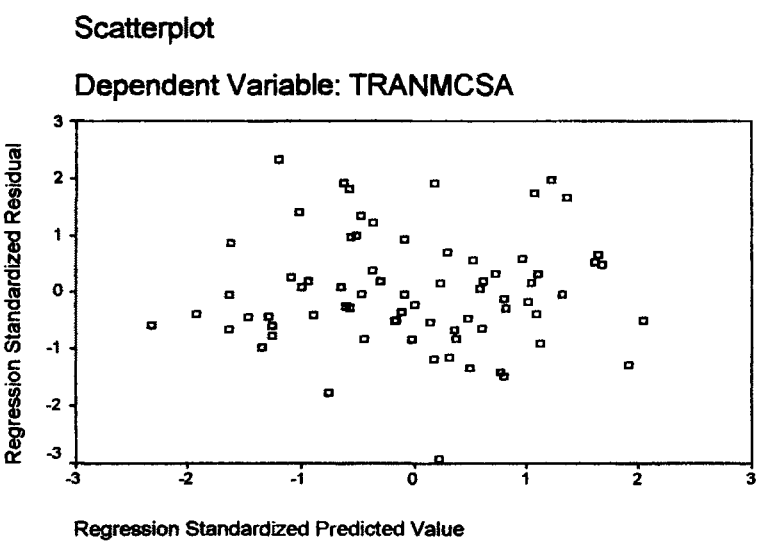
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.7914	4.6043	4.2251	.18609	72
Std. Predicted Value	-2.330	2.038	.000	1.000	72
Standard Error of Predicted Value	.13424	.45533	.25413	.07146	72
Adjusted Predicted Value	3.8429	4.9140	4.2421	.20872	72
Residual	-3.2665	2.6195	.0000	1.09554	72
Std. Residual	-2.918	2.340	.000	.979	72
Stud. Residual	-3.194	2.389	-.007	1.013	72
Deleted Residual	-3.9140	2.7299	-.0170	1.17519	72
Stud. Deleted Residual	-3.439	2.477	-.007	1.035	72
Mahal. Distance	.035	10.760	2.958	2.248	72
Cook's Distance	.000	.506	.019	.060	72
Centered Leverage Value	.000	.152	.042	.032	72

a. Dependent Variable: TRANMCSA

Charts


Normal P-P Plot of Regression Standa
Dependent Variable: TRANMCSA
Expected Cum Prob
Observed Cum Prob
0.00
.25
.50
.75
1.00


Scatterplot
Dependent Variable: TRANMCSA
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3

Appendix N

Mental Health Component:

Regression Analysis Untransformed Variables

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
MCSA	52.0812	9.79710	72
PHYHRS	19.1132	19.36934	72
PASHRS	106.9342	73.04520	72
RDSALL2	29.5833	2.00527	72

Correlations

		MCSA	PHYHRS	PASHRS	RDSALL2
Pearson Correlation	MCSA	1.000	.153	-.019	.073
	PHYHRS	.153	1.000	-.088	.117
	PASHRS	-.019	-.088	1.000	.054
	RDSALL2	.073	.117	.054	1.000
Sig. (1-tailed)	MCSA	.	.100	.438	.271
	PHYHRS	.100	.	.231	.165
	PASHRS	.438	.231	.	.325
	RDSALL2	.271	.165	.325	.
N	MCSA	72	72	72	72
	PHYHRS	72	72	72	72
	PASHRS	72	72	72	72
	RDSALL2	72	72	72	72

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	RDSALL2, PASHRS, PHYHRS[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: MCSA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.163[a]	.027	-.016	9.87713

a. Predictors: (Constant), RDSALL2, PASHRS, PHYHRS

b. Dependent Variable: MCSA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.875	3	60.292	.618	.606[a]
	Residual	6633.926	68	97.558		
	Total	6814.800	71			

a. Predictors: (Constant), RDSALL2, PASHRS, PHYHRS

b. Dependent Variable: MCSA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	42.631	17.368		2.455	.017			
	PHYHRS	.360E-02	.061	.146	1.202	.233	.153	.144	.144
	PASHRS	-1.20E-03	.016	-.009	-.074	.941	-.019	-.009	-.009
	RDSALL2	.276	.590	.057	.468	.641	.073	.057	.056

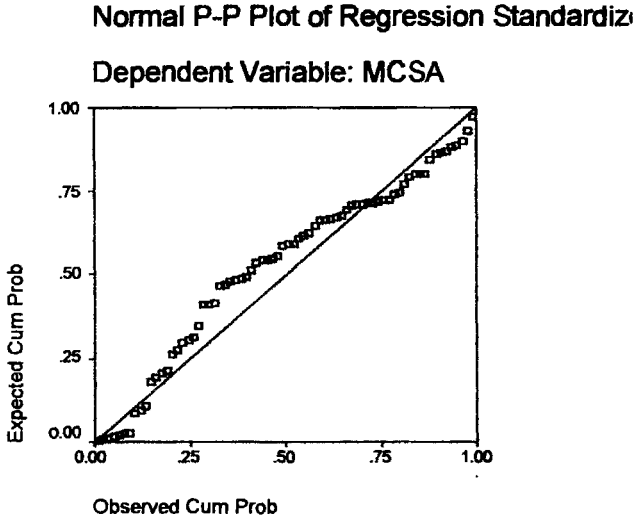
a. Dependent Variable: MCSA

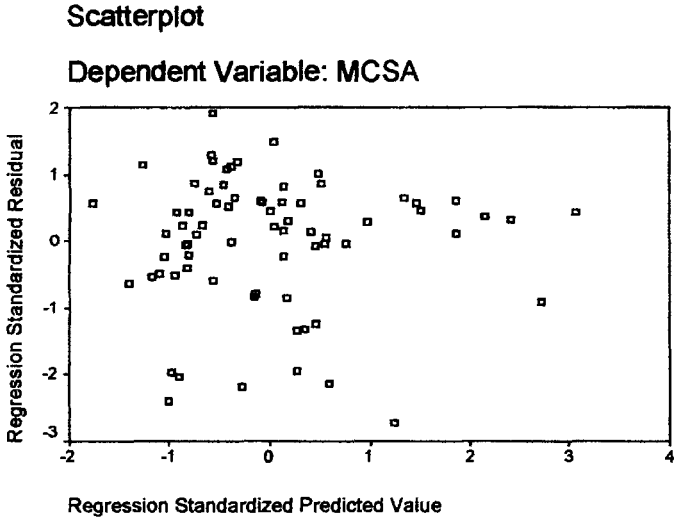
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	49.2508	56.9798	52.0812	1.59610	72
Std. Predicted Value	-1.773	3.069	.000	1.000	72
Standard Error of Predicted Value	1.25676	3.98383	2.21516	.72122	72
Adjusted Predicted Value	47.4964	57.8402	51.9509	1.74106	72
Residual	-26.7797	18.9668	.0000	9.66621	72
Std. Residual	-2.711	1.920	.000	.979	72
Stud. Residual	-2.767	2.099	.006	1.006	72
Deleted Residual	-27.8947	22.6519	.1304	10.21667	72
Stud. Deleted Residual	-2.916	2.154	.000	1.025	72
Mahal. Distance	.163	10.564	2.958	2.668	72
Cook's Distance	.000	.214	.014	.029	72
Centered Leverage Value	.002	.149	.042	.038	72

a. Dependent Variable: MCSA

Charts


Normal P-P Plot of Regression Standardiz
Dependent Variable: MCSA
Expected Cum Prob
Observed Cum Prob
0.00
.25
.50
.75
1.00


Scatterplot
Dependent Variable: MCSA
Regression Standardized Residual
Regression Standardized Predicted Value
2
1
0
-1
-2
-3
-2
-1
0
1
2
3
4